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OCTOBER
1956

VOLUME 49
NUMBER 8

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NATURE MAGAZINE

MEASURE OF SERVICE...MARK OF INTEGRITY

Wetlands Report

Following a two-year inventory and specialized study, the U. S. Fish and Wildlife Service has issued a report entitled *Wetlands of the United States*. This report looks toward the day "when a combination of soil science and greater wildlife-value appreciation will result in setting aside more and more wetland sites for wildlife use." This is not the first inventory of the Nation's wetlands, but it is the first such study in which wildlife is placed in proper perspective with other resources in a balanced land-use pattern. The report covers 74,440,000 acres of wetlands, and this includes 90 percent of the waterfowl-use wetlands. This acreage is classified, placing certain acres in the class of high value for wildlife, others being of moderate, low, or negligible value. Of the total acreage only 8,819,900 acres are held to be of high value, and 13,616,500 of moderate value. For example, Florida has 17,185,300 acres of wetlands in the four categories of inland fresh, inland saline, coastal fresh, or coastal saline. However, only a little more than two million of these acres are of high or moderate value. The report covers all phases of the wetland subject, including encouragement of local wetland projects, flyway management, watershed and land-use planning, and wetland development and preservation. The report is published as Circular 39 of the Fish and Wildlife Service.

Shorelines

In 1954 a friend of the National Park Service provided funds for a survey of the Atlantic and Gulf shoreline to discover what is left of desirable seashore that may be saved for public enjoyment. The results of this survey have been published in an important but alarming report entitled "Our Vanishing Shoreline." Conrad L. Wirth, Director of the National Park Service says: "Only a fraction of our long seacoast is left undeveloped for potential public use, and much of this small portion is rapidly disappearing before our eyes. The survey will have served its purpose well if public-minded citizens and local, State and Federal Governments are stirred to take necessary steps—before it is too late—to preserve this priceless heritage."

The survey found that only 240 miles of the 3700 miles of general

coastline from Maine to Texas are in Federal or State ownership for public recreation purposes. About half of these miles are embraced by three areas in the National Park system—Acadia and Everglades National Parks and the Cape Hatteras National Seashore. The major remaining opportunities for conservation of seashore resources are largely confined to 54 undeveloped areas comprising 640 miles of beachfront. The supply of undeveloped beachfront is dwindling rapidly under pressure of demand. Prompt action is important. The report states: "The critical situation deserves the attention of all persons and organizations in a position to give aid—women's clubs, Chambers of Commerce, historical societies, service clubs, universities, conservation groups, etc." Copies of this report are available from the National Park Service, Department of the Interior, Washington 25, D.C.

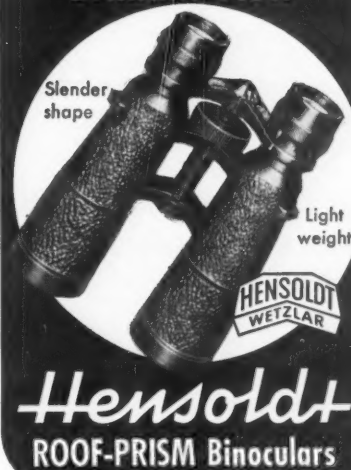
Horned Chameleon

A three-horned chameleon from East Africa was recently added to the reptile collections of the Smithsonian Institution. This fantastic creature has sometimes been described as a miniature of the ancient monster dinosaur, *Triceratops*, extinct some 75 million years and, of course, no relative. The chameleon grows to be more than twelve inches long and its horns, which are an inch and one-half long, protrude from the nose and between the eyes of the males. The females are hornless. These reptiles are harmless to man but pugnacious and will sometimes fight one another to the finish with their horns. The males are brilliantly colored with blues, greens and yellows, and will face up to an enemy, trying to frighten it away by looking ferocious and inflating the body.

Soil Handbook

A distinguished list of authorities in the fields of soil and horticulture is to be found on the title page of the 80-page booklet entitled "Handbook on Soils" published by the Brooklyn Botanic Garden, Brooklyn 25, New York. The relation of fertilizers, bacteria, earthworms, compost, soil-testing and many other subjects are discussed in popular terms. Illustrations add to the usefulness of this bulletin, which is available from the Garden at one dollar.

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OCTOBER, 1956 VOL. 49, NO. 8

Published by the **AMERICAN NATURE ASSOCIATION** to stimulate public interest in every phase of nature and the out-of-doors, and devoted to the practical conservation of the great natural resources of America

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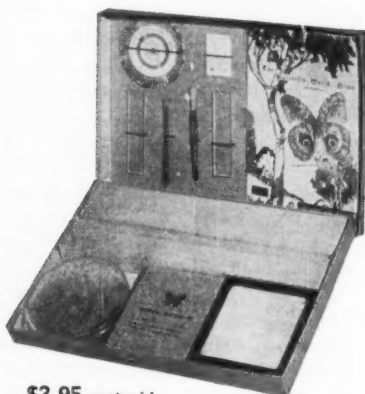
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Philatelically

Specialization in stamp collecting never ceases to amaze us. In "Topical Handbook No. 5," published by the American Topical Association, 3306 North 50th Street, Milwaukee 16, Wisconsin, there is a list of 636 "Zoological Post Offices of the United States" compiled with what must have been tedious attention to the *Postal Guide* by Geneva Smithe. It is suggested that collection of these topical postmarks makes an interesting topical sideline.

Maryland Wildlife

Seventy-five species of mammals, birds and fishes are covered in "Maryland Wildlife," the first in a series of booklets to be issued by the Maryland Game and Inland Fish Commission, 516 Munsey Building, Baltimore 2, Maryland. An 80-page publication, it covers the range, description, life history, management and economic value of the species included. Originally published as a newspaper feature, the response from teachers and school students was such that the material has been consolidated into this booklet, available at fifty cents a copy.

Pollution Progress

Extension of the Federal pollution control program through recent Act of Congress, and increased construction of sewage treatment plants holds promise for the eventual solution of our serious stream pollution problems. During the first quarter of 1956 contracts for 169 projects of sewage treatment were awarded by municipalities, to the total of \$129,000,000. This provided for 73 new plants and 96 interceptor sewers, enlargements and other related projects. One huge project for Allegheny County, Pennsylvania, involved contracts totalling \$78,000,000.

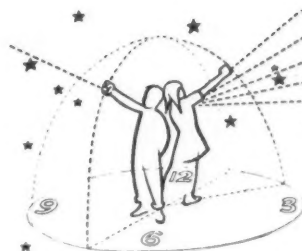


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Nature IN PRINT

By HOWARD ZAHNISER

Roosevelt, the Naturalist

REMEMBRANCE OF THEODORE ROOSEVELT is unusually vivid these days among Americans who are enjoying so many benefits of the conservation movement that he so greatly advanced—and, indeed, in many respects himself instigated, or joined with a few others in so doing. A national observance of the anniversary of the conservation congress of the governors of the States, held in 1908 at President Theodore Roosevelt's call, is being planned. Republican sensitiveness to current conservation issues is emphasizing the Theodore Roosevelt tradition in this year of presidential and congressional elections.

I have just returned to Helena, Montana, from a week of walking the trails of the Bob Marshall Wilderness Area and, on thinking of Theodore Roosevelt, recall noting that it was he who established, fifty years ago, the Lewis and Clark National Forest, in which the part of the wilderness that I was enjoying is located. A month ago canoeing with Ernest C. Oberholtzer in the wilderness of the Quetico-Superior and listening to this champion of conservation tell of the struggles to preserve the public values of this watery land, I was surprised to hear Ober say that one of the most eloquent statements of these values in relation to proposals for their exploitation was in a veto message that Theodore Roosevelt sent to the Congress.

Camp in Roosevelt Park

En route from this wilderness canoe country to the wild mountain areas of the West where the primeval is still preserved I camped, with my family, one Saturday night in the Theodore Roosevelt Memorial Park in southwestern North Dakota, back a ways from the Little Missouri River. It was a lovely sunset time. After the camp was made, while the dinner was being prepared, I walked down to the river and found it a slow, sluggish, muddy stream, then and there, with mud flats between

the water and the banks. The hills beyond it were picturesque. Impressed already with the evening magic of the badlands, through which we had driven a winding way, I felt there the bigness and sweep of the nation of whom, and for whom, the man for whom this park was named was and is a hero. As I turned to walk the eighth of a mile or so across the river valley to the cottonwood grove where the campground was, there was a full or near-full moon (it was July 21) rising to add moonlight to the scene. The next morning, a bright sunny Sabbath, I gave my young son Edward, Paul Russell Cutright's recent volume *Theodore Roosevelt the Naturalist* and pointed out to him the chapter "First Taste of the West," telling of Roosevelt's associations with this land of the Little Missouri.

Roosevelt's first taste

Edward's chores done, he read this chapter at the campsite table, while the camp was being broken, and pronounced it good. Urgencies of a planned itinerary kept me that morning from writing thus of this newest biography of T.R.—in the scene of the national memorial park named for him, as I should have liked to do, although the excitements of such scenes often themselves are frustrations of expression at the time. On this new bright Sabbath morning in Helena, three weeks later, recollection of the experience in Theodore Roosevelt National Memorial Park takes its place with thoughts of other remembrances of this pioneer appreciation of our American outdoors—and deepens appreciation of Dr. Cutright's emphasis on Roosevelt's outdoor, natural history interests and achievements, which were so central in his character and career.

There are many interesting revelations of emphasis in this volume, even to those who have devoted considerable attention to Theodore Roosevelt as a conservationist. We are all, for example, fairly familiar with T.R.'s insistence on those aspects of conservation that involve

wise, prudent use of those natural resources that provide us with the commodities of our civilization. We are less aware of his eloquent insistence also on the preservation of some areas without the kind of use that changes the natural scene. Dr. Cutright's appraisal includes this insistence. On that same Sabbath when we left Theodore Roosevelt National Memorial Park we camped at night in the delightful campgrounds at the base of Devil's Tower in Wyoming—in the first national monument ever established, and established by Theodore Roosevelt. As to preservation of areas unspoiled one of the most forthright pronouncements ever made was Theodore Roosevelt's at the Grand Canyon, in 1903. Dr. Cutright quotes the following paragraph:

Unparalleled Grand Canyon

"In the Grand Canyon, Arizona has a natural wonder which, so far as I know, is in kind absolutely unparalleled throughout the rest of the world. I want to ask you to do one thing in connection with it in your own interest and in the interest of the country—to keep this great wonder of nature as it is. I hope you will not have a building of any kind, not a summer cottage, a hotel, or anything else, to mar the wonderful grandeur, the sublimity, the great loveliness and beauty of the Canyon. You can not improve it. The ages have been at work on it, and man can only mar it."

Dr. Cutright notes that Roosevelt "battled unsuccessfully to have the Grand Canyon made a national park." Reassurance for ourselves in our often frustrating efforts to obtain desirable legislation is in Dr. Cutright's explanation that (despite the efforts of T.R. at his high eminence) the Grand Canyon area was only a game preserve by 1906, a national monument by 1908, and "did not achieve the status of a national park until 1919."

Theodore Roosevelt's leadership in establishing conservation policies with regard to the wise use of the natural resources that supply our needed commodities is by now widely recognized—his cooperation with Gifford Pinchot for the development of forest conservation, his dynamic association with others in establishing reclamation programs and water conservation attitudes, for example. Dr. Cutright's volume is helpful in making vivid the details of this

leadership.

The signal contribution of this book *Theodore Roosevelt the Naturalist*, however, is not in amplifying an understanding of these achievements already so well known. Rather it is in demonstrating that they were achievements of a man who was indeed at heart an outdoors person, a naturalist. As is still true in our own national experience, the force exerted for the prudent use of our resources even for economic purposes came from an awareness of the natural world.

"Roosevelt," Dr. Cutright records, "entered Harvard with the avowed intention of devoting his life to natural history." A boyhood journal written when he was some eight years of age, or thereabouts, had recorded the start of a museum "with twelve specimens" (sic) at the "commencement of the year 1867" and the accumulation with a confederate of "a total of 250 specimens" by the end of 1868. The diversion of Roosevelt's natural history career into the politics and statesmanship that brought fame and public opportunity is part of Dr. Cutright's biographical concern, of course, and he deals with this and with the natural history interests of Roosevelt in his prime with interest and satisfaction for the inquiring reader.

As in the beginning of the book (and the life), so also at the end the outdoors interests are paramount. The African and Brazilian expeditions are chronicled with a vividness that will make many wonder why these Roosevelt adventures had slipped the mind. All in all, Dr. Cutright accomplishes his purpose of illuminating our understanding of Roosevelt by showing his natural history and outdoor interests and motivations. As his publishers say on the book's jacket, his "thoughtful portrait establishes Theodore Roosevelt's eminence as a naturalist on an equal footing with his political and military achievements."

Theodore Roosevelt the Naturalist. By Paul Russell Cutright. New York: Harper & Brothers. xiv + 297 pp. (5-3/4 x 8-1/2 in.), with illustrations and index.

Gold on the Desert

By Olga Wright Smith. Albuquerque, New Mexico. 1956. University of New Mexico Press. 249 pages. \$4.00.

The author's husband was an

engineer, her father-in-law a prospector who reported a find of gold and copper in the Lechuguilla Desert of southern Arizona. Mrs. Smith, however, had been an Iowa school teacher with the conviction that the desert was chiefly rattlesnakes and scorpions, and her reaction to her husband's enthusiasm to burn bridges and be off to Arizona was something less than ecstatic. But go they did, and this is a human, fascinating and first-person story of Mrs. Smith's gradual but not uncomplicated experience in falling in love with the desert and its creatures. When it was finally discovered that neither the gold nor the copper could be turned into the wealth anticipated, Olga and "Cap" finally left Dad to his desert and a chrysocola find, the author with a regret that she had never believed possible. Here is different, entertaining reading.

A Book of Wild Flowers

By Elsa Felsko. New York. 1956. Thomas Yoseloff, Inc. Illustrated by reproduction of 160 watercolors. Preface by C. D. Darlington. \$8.50.

This is the first American edition of this lovely collection of wild-flower plates. The plates are grouped together in the front of the book and supplemented by text by Sheila Littleboy, describing the plants and indicating their distribution. Many of the plants treated have been introduced into North America and spread widely here. Others are confined to Europe outside the United Kingdom.

The Jungle Whispers

By Kenneth W. Vinton. New York. 1956. Pageant Press. 221 pages. Illustrated. \$4.00.

Here is a fascinating story of the Panamanian jungle by a naturalist who has come to know it intimately during nearly a quarter-century of living in the Canal Zone. During World War II he was a lecturer with the Army's Jungle Survival Program, drawing upon his wide knowledge of the Tropics. In this book there is adventure and excitement, as well as much interesting information on jungle flora and fauna. For all the hazards of the jungle, however, the author feels that "after the nerve-jangling effects of harried city life with its noise, its deadlines, and its racing traffic, a calm jungle night with its many soft voices seems to hum as especially peacefully lullaby."

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A TIMELY REPORT by two leading conservationists on a significant field study of wildlife in Alaska—particularly caribou, moose, and reindeer. Points out today's opportunity for the sound development of a still virgin area. "Interesting and valuable."—NATURE MAGAZINE. 28 illus., maps; 129 pp. \$2.75

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Reviews

All on A Mountain Day

By Aileen Fisher. New York. 1956. Thomas Nelson and Sons. 126 pages. Illustrated by Gardell Dano Christensen. \$2.75.

"Few writers are so successful in capturing the spirit of Nature and the outdoors as Aileen Fisher has been in this delightful book," we said in a foreword to this story of a June day among some of the creatures on a Colorado mountainside. This was our estimate after reading the galley proofs, and we find no reason to revise our opinion upon a second browsing through this book. The author lives with the wild folk, loves them and understands them, hence her success in giving to her readers a sense of oneness with the nine animals she has chosen as the characters in her cleverly woven story. Here is no sugar-coated tale of associations in the wild, nor, on the other hand, any over-dramatization of the problems of life among wild creatures. Miss Fisher has written for the younger audience, but an adult would find as much pleasure in her book; no doubt some adults will do so when they happen to have the opportunity to read it aloud to a youngster. We would place this book high on the list of acceptable Nature books for young people. R W.W.

Western Wonderlands

By John L. Blackford. New York. 1956. Vantage Press. 120 pages, plus 96 plates in black and white. \$5.00.

Many readers who, through the years, have come to admire the fine writing and splendid pictures by John Lindsey Blackford, in the pages of *Nature Magazine* and elsewhere, will be interested in the appearance of this book. This is not, however, a collection of this author's writings, for his book bears the subtitle: "A Guide to Bird Habitats of the Western United States, Birds of the Deserts, Stream Borders, Forests and Mountains of the West." Following an introductory chapter, entitled "Western Wonderlands" and written in Mr. Blackford's flowing style, the author lists various habitats, as, for example, cholla cactus, mesquite stream-border, yucca grove, southwestern cottonwood, California live oak, and so on, with listing of the birds found in these habitats. Sup-

plementing the text are reproductions of more than 110 photographs by the author and 37 by other Nature photographers. Mr. Blackford's approach is, basically, an ecologically one and thus as up-to-date as this morning's newspaper.

The Flamingos: Their Life History and Survival

By Robert Porter Allen. New York. 1956. National Audubon Society. 285 pages. Illustrated in color and black and white. \$3.95.

This splendid work is the result of three years of study and has special reference to the American, or West Indian, flamingo, *Phoenicopterus ruber*. It is published as Research Report No. 5 of the National Audubon Society and takes its place with its four predecessors, which dealt with the ivory-billed woodpecker, the roseate spoonbill, the whooping crane and the California condor. It was undertaken because of the serious threat to the future of the flamingos and as a contribution to a program for their survival. The study was greatly aided by the generosity and personal cooperation of Mr. and Mrs. Stephen F. Briggs, and enjoyed widespread assistance from many interested individuals. In the first four chapters of his report, Mr. Allen, who is research director of the Audubon Society, deals with details of the distribution, numbers, food, ecology, and breeding habits of the birds. Along with this data is information indicating the factors that operate for and against the welfare of the birds. In the fifth chapter the author discusses the conservation of the flamingo throughout the world and the factors that limit its existence and pose problems of protection. Thus we have a most important ornithological publication, and an imposing and valuable assembly of the latest and most complete information on these beautiful and interesting birds.

A Field Guide to the Ferns

By Boughton Cobb. Boston. 1956. Houghton Mifflin Company. 281 pages. Illustrations by Laura Louise Foster. \$3.75.

This is the latest—and welcome—addition to The Peterson Field Guide Series. As with the companion guides, it provides the key to visual identification in accord with the system devised by Roger Tory Peterson. This guide covers the ferns and their related families in north-eastern and central North America.

Thus the horsetails, clubmosses, spike mosses and quillworts of this region are included. A brief section of the book presents the geological history of ferns, placing their contemporary descendants in proper perspective. This section is written by Dr. Theodor Just of the Chicago Museum of Natural History. H. Lincoln Foster contributes a section on the creation and care of a fernery.

Berried Treasure

By F. Kingdon-Ward. New York. 1956. Robert M. McBride Co. 192 pages. Illustrated. \$4.95.

Plant explorer and botanist, the author of this book has traveled to far places. From Tibet and Burma, in particular, he has brought back interesting plants gathered in the course of adventures. This immediate book, as intimated in the original title, is concerned with berry-bearing plants and shrubs that have been found in his travels.

Briefly Noted

The Pursuit of Science in Revolutionary America. By Brooke Hindle. Chapel Hill, N. C. 1956. University of North Carolina Press. 410 pages. Illustrated. \$7.50. This important study covers the scientific progress made in North America during the period 1735 to 1789.

Atoms and Energy. By H. S. W. Massey. New York. 1956. Philosophical Library. 174 pages. \$4.75. A non-technical account of the development of atomic physics that led up to the large scale release of atomic energy.

An Atlas of Animal Anatomy for Artists. By W. Ellenberger, H. Baum and H. Dittrich. New York. 1956. Dover Publications, Inc. 154 pages. Illustrated. \$6.00. An enlarged and revised edition of this book as edited by Lewis S. Brown.

Electrical Interference. By A. P. Hale. New York. 1956. Philosophical Library. 122 pages. Illustrated. \$4.75. Assembly of information on the causes of interference with operation of radios and television sets in Great Britain.

The Adventures of Eagle Wing. By Sister Bernard Coleman, Estelle Eich and Ellen Frogner. New York. 1956. Greenwich Book Publishers. Illustrations by Ruth Maney. 45 pages. \$2.00. Charming story for young people about a Chippewa boy who in 1880 lived on the shore of Mille Lacs in Minnesota.

Contents noted

BY THE EDITOR

SOME HIGHLIGHTS OF THE 5TH GENERAL ASSEMBLY of the International Union for Conservation (see editorial on page 425) may be of interest. Edinburgh, Scotland, was the host city, and a most hospitable host, indeed, even though some delegates from more southerly climates found the Scottish version of late June somewhat on the chilly side. Edinburgh's many parks, large and small, were a riot of beautiful flowers, notably huge and beautiful lupines, while geraniums and lobelias graced the window boxes on the sills of homes and offices. From the humblest dwelling to the beautiful botanical garden, the Scot's green thumb, the advantage of moisture and the long growing day were everywhere in evidence. The platform in the main meeting room was kept decked with gorgeous hydrangeas and other flowers, doing their bit to offset the drafts that swept through the building as workmen labored to furbish up the place for an impending visit of Her Royal Highness, Queen Elizabeth, II.

WORK WAS THE ORDER OF THE DAY—and night—for delegates and committee members during the ten-day session. As a member of the Executive Council, we can testify that the clock meant nothing to those of us charged with mapping the program of the Union. It meant even less to the loyal members of the staff, who managed, somehow, on three or four hours sleep a night in order to keep the delegates supplied with the necessary papers to expedite the sessions. It takes a certain degree of dedication to labor thus.

TRADITIONAL CEREMONY IS A CHARMING ASPECT of Scottish hospitality. This was evidenced by the formality of the reception in City Chambers by the Lord Provost, Magistrates and Council of the City of Edinburgh, who, in full regalia personally greeted each guest. The reception in the Banqueting Hall of the Castle by Her Majesty's Government in the United Kingdom of Great Britain and Northern Ireland was equally impressive, and that in the lovely Upper Library of the University of Edinburgh less formal but delightful. One felt that we in the United States have been less zealous in holding to ceremony and tradition than we should have been. A crowning ceremony took place at the closing dinner, at which the haggis, looking much like a gray and overgrown sausage, was piped into the dining hall to the tune of bagpipes, and commemorated by the recitation of a poem in Gaelic delivered by a

kilted Scot. Whereupon the haggis was slit open and proved quite interesting to the taste, even though opinions differed as to its composition.

HYDRO-ELECTRIC DEVELOPMENTS IN THE HIGHLANDS were visited by the delegates on a two-day excursion, which also included a seabird reserve on the River Tay, tea at the delightful Scottish country house of Earls Hall, dating from 1546, and culminated with a visit to historic Loch Katrine, source of Glasgow's water supply. The hillsides, with their myriad black-faced and black-legged sheep, and planted forests marching in ranks up the slopes, were interesting. These gave way, as one approached the Trossachs, to many lochs, massed growths of brilliant rhododendrons, introduced some three centuries ago from the Himalayas and now widely spread, and forested hillsides. To one who learned by heart—and still can recite—the first Canto of the *Lady of the Lake*, it was a thrill actually to see Ben Vorlich, Vennachar, Boscawen's Heath, "Ben Ledi's ridge in air," and the Brig o' Turk, where "the headmost horseman rode alone."

STENCILED ON A STREET CORNER TRASH CAN in Edinburgh was the message: "The Amenity of OUR Streets is Recommended to YOUR care." This was, by all odds, the politest way we can imagine of saying: "Don't Be A Litterbug." And the admonition seemed to us to have been most effective. The citizens of this fine Scottish city seem to have been most zealous about the amenities, and we made a special, if unsuccessful, effort to discover carelessly discarded litter. Both the zoological park and the botanical garden, where the delegates were received for tea, were neat as proverbial pins. Innocent of billboards, the Scottish countryside was a joy, as were Denmark's rural areas, where, we discovered, billboards are prohibited. We must admit that, on our return, we were struck by too many evidences of our own lack of concern for the amenities. Not the least such evidence was found in the manner in which our Customs operates, in sharp contrast to the courtesy, efficiency and celerity of customs officials abroad.

FLYING THE OCEAN OVER NIGHT, as we did, seemed to symbolize how really close we are, each nation to another. And meeting with people from thirty-five different nations, many of whom had come farther than we, but with comparable speed, one could not fail to be impressed with the community of conservation interest from a world viewpoint. We felt that the constructive and creative aim of those who give their time and effort, most of them in addition to their regular responsibilities, must assure a solid future for the Union, and promise a growing influence in achieving the conservation and wise use of the renewable natural resources of the world, both esthetic and economic. R.W.W.



FAIRCHILD AERIAL SURVEYS, INC., LOS ANGELES, NEW YORK, CHICAGO

An oblique aerial photograph looking easterly into Yosemite Valley, with the Sierra Nevada in the background. This view illustrates a relatively young range of mountains that has undergone rapid glaciation, forming the valley.

*There are many fascinating things to
see and to learn when you view*

Nature from Aloft

By FRANK A. TINKER

LET us make believe—and this will not be very fanciful, considering the statistics—that you have just stepped aboard a luxurious airliner about to take off from one of the country's busy airports. As a passenger aboard this aircraft, you are one of the travelers who will fly over 15 billion miles of America this year. To put it another way, during 1956 one of every four of your fellow citizens will share your experience.

Despite this wide acceptance of air travel, however, and the comfort and ease with which it is being accomplished these days, your trip still offers adventure—if you will have it so. As long as commercial aircraft fly

within sight of the earth's features, outside your window you will find an opportunity to observe the huge pattern of Nature. Read your newspaper if you like, but it deals only with today; below you ages are spreading their handiwork. Down there is a story so tremendous in its simplicity and scope that it cannot be read at close range. Only through the advantage of altitude can the huge script be reduced to legibility.

Today, with air routes penetrating to the far places of the world, the airline passenger may look down upon different lands and fascinating new scenes. These may include the tundra of Newfoundland, pock-marked with

potholes of water; Greenland's beautiful ice cap; the jig-saw puzzle of Ireland's intensely cultivated fields; the rectangular neatness of the farms of northern Europe and Denmark; the spectacular blues and greens of Caribbean waters; the Alps or the Andes; great deserts. Different though the dimensions of sight-seeing from the air may be, the airlines, for all their strivings to find ways of making the passenger happy, have failed to capitalize on the interest of the customer in what is down below.

Now and then the more extroverted Captain of an aircraft will turn to his public address system to tell the passenger the name of that river or this city; that mountain range, or this lake. But the majority seem to have mike-fright, or have flown over the same route so often that they cannot imagine anyone being interested in the terrain beneath. Nor are the maps in the plane's seat pockets more than just advertising of the length and breadth of the line's coverage. Since flight patterns are reasonably the same between scheduled points, it is time that the airlines provided the passenger with simple maps, after the fashion of the motorist's strip map, showing landmarks along the way. These, plus a little descriptive and informational data, would add vitally to the pleasure of a trip aloft.

To be sure, airplane designers thus far seem to regard the window as a peep-hole useful only to the passenger who happens to get the inside seat. However, the new Viscounts have provided a large oval window through which passengers sitting side by side may see equally well. Perhaps other designers will wake up to the fact that aircraft may really have windows in them.

Of course, many flights are made above the clouds, where there is little to see but the beauty of these formations. But there are at least equally as many trips, even at high altitudes, on which there is much to see and to learn. The spectacular cross-country flight simulated in the first production of Cinerama, and made to the accompaniment of "America, the Beautiful," was a case in point. It proved that to see America from aloft is to appreciate her infinitely varied wonders.

Let us suppose, then, that you are starting from the highly developed, oversettled East. The first thing you will realize—and should realize—as you rise above the city, and can see beyond its narrow streets, is that the metropolis is quite insignificant in the enlarged scale of things. The land, the sweeping roll of a nearby ocean, the limitless march

for October, 1956



U.S. SOIL CONSERVATION SERVICE PHOTOGRAPH

From the air you get a graphic example of heavily eroded country. Note the fan of soil that has been carried to the stream in the lower left of the picture.



U.S. SOIL CONSERVATION SERVICE PHOTOGRAPH

The foothills created by soil brought down from the mountains is fertile but loose. These are terraces cut in the slopes to plant citrus orchards and still retain the hill.

This oblique photograph shows a typical crescent pattern of sand dunes in the vicinity of Delta, Utah. Formations on the ground are specially fascinating from the air.

FAIRCHILD AERIAL SURVEYS, INC.





PHOTOGRAPH BY THE AUTHOR

The power of the oceans of vapor that surround the earth is much underrated. An advancing thunderstorm blots out the sun, drops 100 tons of water in every acre-inch of rainfall.

of vapor from horizon to horizon—these are the parts of the natural world in which you really live. The city is only a temporary and fragile insulation between you and them.

Take the sea, for instance, which you may glimpse before heading inland. Aloft you can grasp the truth of the fact that its allied waters cover more than seventy percent of the total surface of the globe. From your seat, if you look closely, you can see the record of the sea's past inexorable march upon the shore, and, perhaps, predict from this its future boundaries.

The white ranks of waves that move against the land are not really so gentle or ineffectual as they seem from the air. Each year their vast power crushes and carries away whole sections of the continent's basic rock, or deposits miles of sand along some sloping bank. History shows that the battered isle of Heligoland was 120 miles wide in 800 A.D., had been reduced to 45 miles by the sea's action in 1300, and today is used as a bombing target only three miles wide.

From aloft it can be better realized that even a continent itself is in a continual state of flux—a huge, heaving rock covered over thinly with a layer or two of very movable soil. The treatment of that soil governs the life of every natural entity, including Man, that treads or grows upon it.

Now our aircraft moves over the Appalachian chain, wooded and rounded so greenly. You can see that age has gentled it. Two hundred million years ago the earth wrinkled along this line as the surface shrank and a giant ridge was thrust up from northeastern Canada to our mid-South. The fact that it now looks so little like story-book mountains is due to the factors that have been working at it so long.

Frost, wind, and rain have done their bit toward loosening the rock and carrying it into the valleys. Some deltas of this sediment can still be seen where a tributary stream joins the valley. That these are not

widespread is because the job is almost done, the slopes are no longer steep or barren and water cannot now run fast enough to carry much of the rock with it. The hillsides are gentler, the valleys wide and level. Rivers wind easily through flats or gaps cut across the range by the retreating glaciers.

Notice that flat top of one crest going past below; compare it with the other flat tops nearby. Now it seems far less strange to say that these mountains once were sheared by glacial scissors two miles thick, reduced to a plain, then shoved up again, whereupon the flowing water resumed its incessant work of cutting it apart and carting it away. As a matter of fact, now that you can see it, all the sleepy words you may have read about land formation begin to stir a little as you see the geological drama played beneath you.

When it is said that Long Island Sound was only recently spooned out of the coastal plain by the irascible ice, advancing and retreating at least four times, the last time not more than 10,000 years ago—why, so be it. What could be more obvious? Likewise, these mountains are undoubtedly great folds of the earth, because you can see the very wrinkles spreading out as in a carelessly thrown coverlet.

Then the mountains are gone, and you may be flying over the flat mid-West where there never have been mountains. Much of the flat, rich soil actually comes from northeastern Canada, which was stripped bare by waves of ice and its layers of covering soil carted south. Where there are long, low hills, seen from above as lobes or fringes in a flat tapestry, you may visualize the fingers of ice protruding and melting, dropping their cargo of rocks and silt.

But probably the most striking feature of all will be the rivers and watercourses which are so plainly traced from above. This very air on which you are riding is not only substantial enough to support the few tons of your aircraft, it also carries unbelievable loads of moisture dredged up from the sea. One storm, resulting in only an inch of rainfall, deposits more than one hundred tons of water on each acre of earth. And this flood must

One of the tragedies of the plains States. A wall of dust 12,000 feet high advances into the course of the aircraft, brought up by wind from the light soil of the fields below.

PHOTOGRAPH BY THE AUTHOR



go somewhere, and, in departing, will leave its mark.

In the process of such going it creates the many channels and sinks that pattern the countryside and the extent of which you probably never realized until you flew over them. Where the water itself cannot be seen, the heavier vegetation that feeds upon it signals its presence. In the savannah and prairie land, the lines of moisture beneath the surface are traced by a darker soil and plant cover. Where there is a significant, flowing stream a rank of attendant trees can be spotted for miles from your plane.

Considering that scarcely a field or a hillside does not bear the scars of erosion, visible from above, does it seem quite so fantastic then to say that millions of tons of earth are carried to the sea each year from this land? Some of these carriers of the soil are very young, some are older than the land over which they flow. From where you sit, the difference is easily marked. The younger streams are straight, narrow, and probably cut deeply into the terrain. The older ones, which wind peacefully through the valleys, have taken a long time

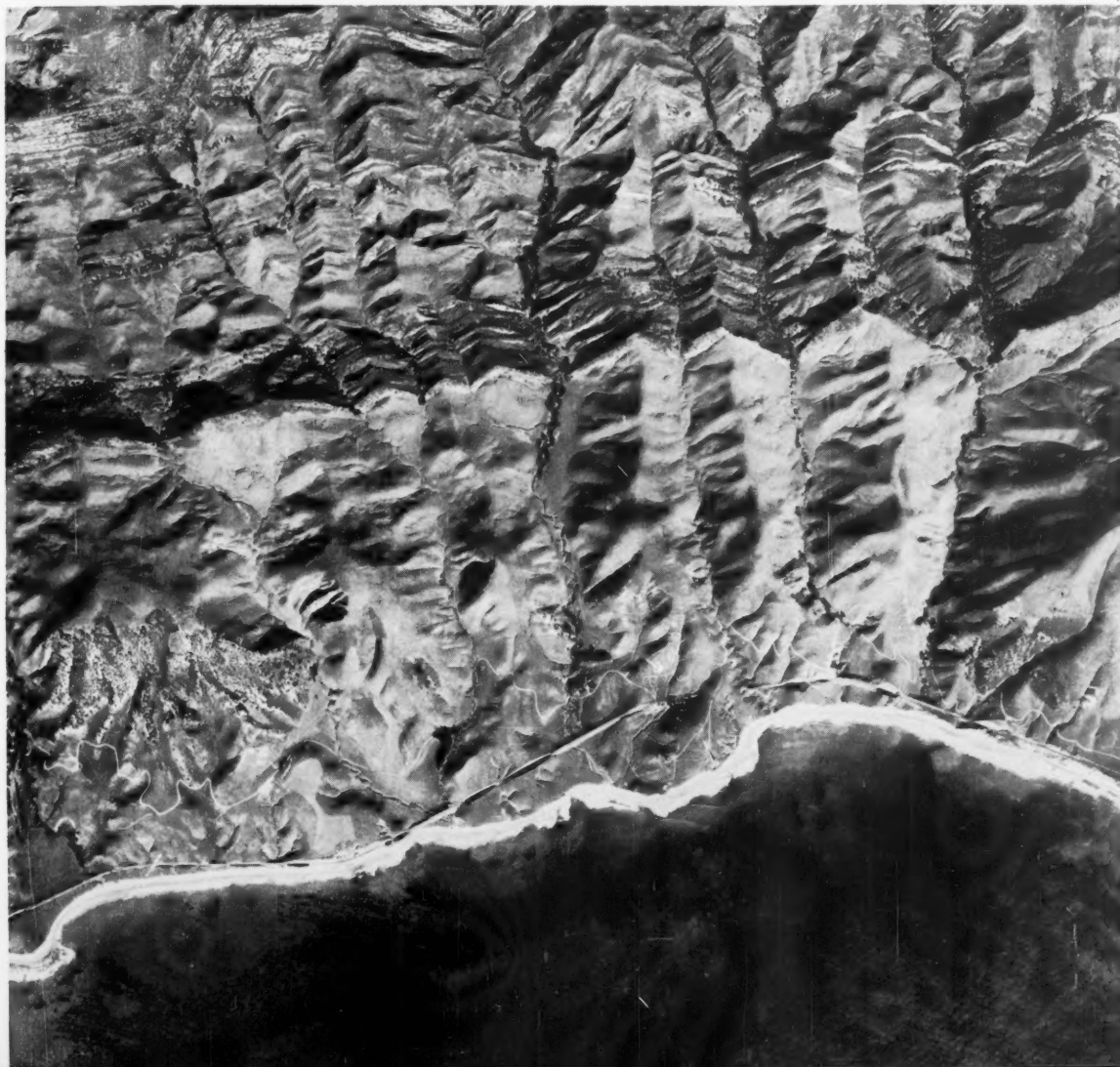
in their work, changing course a hundred times to cut into hillsides and lay down the fields.

If you fly over the Mississippi River, or the broad valley streams, see how many previous routes of the water you can trace. Over the Colorado's Grand Canyon, or the mountain streams of the far West, note the steep sides of the gorges they have cut and the more direct line of their descent to the plain. Incidentally, the Colorado is a good illustration of a river that preceded the land through which it now cuts such a magnificent swath. The swift stream probably never flowed at the altitude of the canyon's rim. Rather, it has maintained about the same level while the land has risen under it and has been cut away.

The speed and efficiency of these streams as great levelers can be marveled at from 10,000 feet overhead, where you can see the extent of the fan-shaped alluvial deposits they leave as they break from the slopes into the plain. Streams from the Rockies spread their fans all the way into Kansas, while most of the orange groves of California thrive on the rich soil freighted

A vertical photograph taken along the Pacific coastline of Santa Barbara County, California. This indicates clearly the banded kelp beds in the ocean due to selected growth in favorable strata.

FAIRCHILD AERIAL SURVEYS, INC.



down from the heights of the Sierra Nevada.

The mountains of the West are, exactly as they appear, newer than the smooth Pennsylvania hills. As a result, they are higher, steeper, and more sharply defined. Whereas both the eastern ranges and the Rockies were flung up by a folding of the earth's crust, new elements enter into the formation of the escarpments and cones of the Sierra and Cascades.

Here, the top rock layers simply split under immense pressure and were thrust up to form the steep faces and shelves of the coastal ranges, while volcanoes reared their cones as high as California's Mount Lassen, 10,453 feet above sea level. Activity of this sort built most of the western ranges only one million years ago—is still building—and the lava flow from such volcanoes formed the whole west Columbia plateau. True, one can see these from the ground as well, but rising above them, detaching one's self from the earth, one can encompass so much more, relate these huge masses to the even larger whole.

For man's life is entirely dependent upon what you have seen from your airplane window and his ability to adapt thereto. In his efforts to adapt in America, as well as in every other continent, gross errors have been made that only now are being set aright, particularly in the field of agriculture. The practice of contour plowing is well known, for instance, but its full reason and effect is only fully seen from aloft. Merely by forcing the water run-off to traverse a furrow rather than course along it, whole farm areas have been saved. Yet flying from Oklahoma to Wyoming, or from Wisconsin to New Mexico, you can see, in storm season, that the lesson is not yet completely learned.

Particularly on the large commercial farms the short-sighted rectangular cultivation pattern leaves the fields vulnerable to wind and flood. Look carefully, and you can see as surely as night the thickening or disappearance of the furrows in northeasterly channels across the fields.

This is the area where, in summer, you watch for the horizon to dissolve and the sun darken in midday. The gusts preceding a thunderstorm send the fine loose soil up to 20,000 feet, thick as a cloud. In a single black day thousands of tons of soil may be transported from the plains to the Great Lakes area. The basic reason—the people who work this soil still do not realize its essential



U.S. SOIL CONSERVATION SERVICE PHOTOGRAPH

A valley cultivated to retain its soil. The strips of different crops prevent wind erosion of the soil, and contour plowing cuts across potential water courses and slows erosion from this source. The plan of soil conservation is thus spread before the passenger in the airplane.

character. Most of it arrived by wind or sedimentation and is easily wind-lifted when dry. Unless a constant covering of vegetation is kept on it, or the effect of the wind is diminished by planting vari-seasoned crops in protective strips, sooner or later it will be swept clean. This is not the deep South, where the topsoil is thick, but a place where a few inches lost may mean the difference between a crop and disaster.

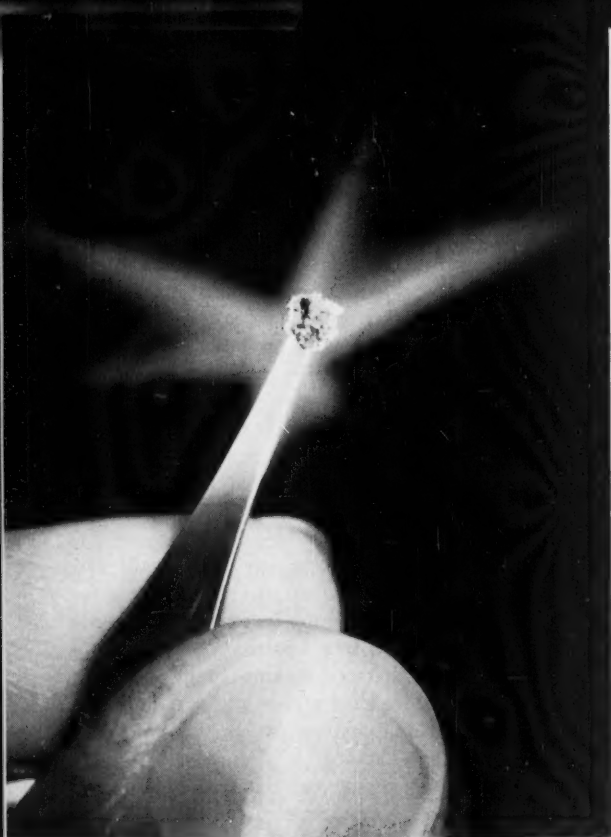
Looking for these things during your flight—the aging mountain giving its flesh to the fertile plains; the patient, bustling river that works hardest where there is most to do; the questionable pattern of man's handiwork on field and forest (an average summer flight from Colorado to California should spot a half-dozen fires); the boundaries of dead and vanished seas that covered parts of North Dakota, Minnesota, New Mexico, Arizona, New York, Utah, and Nevada. Until some company maps are supplied, buy one of the regional maps usually available at the airport office, and ask the pilot to trace out your route. Ask him about the air masses you will traverse in arriving at your destination. He must know Nature to be successful, or proficient.

Then, perhaps, as you start your descent at, say, Los Angeles, you will feel that you have gained a better appreciation of the world on which you live so casually.

FULL MOON OVER HILLS

*Let us not go too soon,
Or we might miss it going by —
The motion picture of the moon,
The ancient history of the sky.*

Daniel Smythe



A cluster of man-made diamonds produced at the General Electric Research Laboratory at Schenectady, New York.

been vastly accelerated by the close tolerances required in the manufacture of defense materials and precision instruments. Small diamonds are used to cut, and diamond-dust to polish, the ever stronger and harder materials demanded by higher temperatures, higher speeds, higher stress and higher mechanical performances.

The present search for a method of making diamonds, it should be understood, was not sparked by vanity, nor, for the moment, by profit (thus far man-made diamonds are more costly than natural diamonds), but to help to meet defense needs. Perhaps, in the future, diamonds of "gem quality and size" may be achieved, but these would be by-products.

Man-made industrial diamonds are now being produced in limited quantities at the Detroit plant of GE's Carbonyl Department, as experiments continue, but not for sale. To commemorate the scientific achievement, a plaque was presented to the Smithsonian Institution, in Washington, D.C., in May, 1956.

Around a cluster of the first laboratory diamonds, at the top of the plaque, are plastic triangular trays con-

Nature's hardest substance now duplicated as

Man-Made Diamonds

By E. JOHN LONG

FOR centuries alchemists sought unsuccessfully to make gold from baser metals. During a somewhat less period of time, scientists have tried to produce diamonds, hardest of substances, artificially.

In the quest for diamonds, there was a tangible result in 1954. A team of experts working in the General Electric Research Laboratories came up with a diamond-like material that met every known test, including X-ray diffraction, to prove that it was identical with diamonds mined in Africa and South America.

This was an important development, not only because the United States does not produce any diamonds (the last source of supply, in Arkansas, having played out), but also because the need for diamonds in industry has

Plaque presented to the Smithsonian Institution by General Electric exhibits, above the inscription, a central cluster of the first tiny stones produced by the GE Research Laboratory. Surrounding the cluster are 100 carats of industrial-grade diamonds produced by GE's Carbonyl Department, now in limited pilot-plant production.





The first tool using man-made diamonds is the experimental cutting wheel, which cut grooves in Alundum, one of the three materials next to diamond in hardness.

taining samples of tiny industrial diamonds made by the same process in GE's Research Laboratory in Schenectady, New York, and in the Carbonyl Department, in Detroit, Michigan. While it is estimated that there are 50,000,000 diamonds in the exhibit, the total weight of the stones is only 100 carats.

"Just how were the first man-made diamonds achieved?" members of the GE science team, present at the Smithsonian ceremonies, were asked. They said they would be glad to describe most of the process, except one important item—the basic ingredient. That was still under security wraps. However, they conceded that a "carbonaceous compound" was subjected in the process to the highest combined pressures and temperatures that man has ever attained, duplicating conditions that might be found 250 miles beneath the earth's surface.

To be more specific, the trick was finally turned with simultaneous pressures of 2,700,000 pounds per square inch and temperatures exceeding 5000 degrees Fahrenheit. Nearly four years of experimentation, trial and error, and not a little frustration ensued between the testing of the formulae and the production of the first diamonds, in 1954;—or rather, the reproduction of more than one batch, for the key proof in any such scientific achievement is *reproducibility*.

The cluster of GE's first laboratory

diamonds, presented to the Smithsonian, is about three sixteenths of an inch in diameter and is composed of many stones, the largest weighing less than 1/100 of a carat. The even smaller stones in the surrounding trays have been graded in accordance with established sizes for different industrial, grinding and polishing uses.

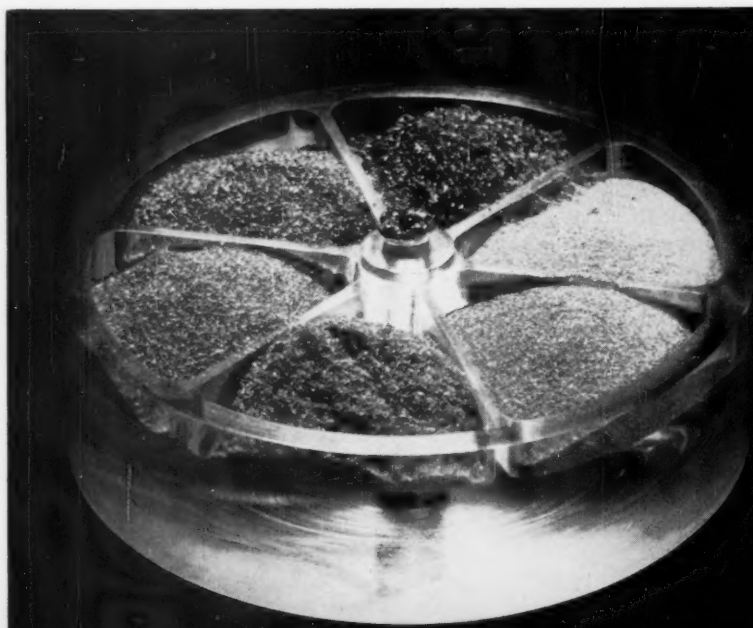
"We are not attempting to make stones of gem quality and size," Dr. C. G. Suits, vice president in charge of GE's research, emphasized. "The most important prospect from this discovery is that we will soon be able to make this unique substance available for widespread use in manufacturing. Fortunately, 80 percent, by weight, of the industrial diamonds now used by the United States are of sizes that can be readily produced by this process."

Dr. Suits added that his company's man-made diamonds "are at least as good as natural diamonds for most industrial purposes. I think there is a good chance that they eventually will be superior to the natural product. Industrial diamond-making could become a \$200 million annual business within the next decade if the cost of man-made diamonds can be brought down below those now being mined."

Because the average person sees diamonds only in gem form, the stone is generally regarded as something that comes only in small packages. Yet two and a half tons of diamonds are mined every year, of which the United States takes about 90 percent. For industrial diamonds purchased in a typical year, this country pays more than \$50,000,000. The need for non-gem diamonds continues to grow, not only for cutting tools needed in defense industries, and in polishing and grinding, but also in high-speed dental instruments, etc. Diamonds are also included among essential materials being stock-piled for defense by the government.

The history of man's attempt to make diamonds is a fascinating story, extending back over a century and a quarter, and involving many claims of success or near-

Close view of the 100 carats of industrial diamonds and the central tiny stones. This is part of the exhibit presented to the Smithsonian Institution.



success. In 1880, J. B. Hannay tried to make diamonds by increasing the temperature of a mixture of hydrocarbons, lithium and bone oil to a red heat in sealed wrought-iron tubes. The process was risky because of exploding tubes. During his experiments 77 out of 80 tubes blew up.

Another early experimenter, Henri Moisson, dissolved sugar charcoal in molten iron. He then doused the mass into cold water. Moisson expected to crystalize the carbon under the enormous internal pressure built up as the mass cooled from the outside. But all he got were traces of material that had optical qualities similar to those of diamonds.

In 1950 Professor N. V. Sidgwick, of Oxford, and Henry Eyring, of the University of Utah, reviewed all the claims and counter-claims to diamond synthesis. They finally came to the conclusion that it appeared to be highly unlikely that actual diamonds could have been formed under the conditions used in any of the experiments described in the extensive scientific literature on the subject. Also, except for a few controversial specimens, there is no surviving evidence of the substances produced, or claimed to have been produced.

While details of the General Electric apparatus and process of manufacture are still restricted, the company's scientists state that it is not necessary to introduce diamond seeds. Laboratory diamonds form in several of the familiar crystal habits found in Nature, including octahedra, tetrahedra and dodecahedra. Chemical analysis shows that the crystals made are 86 to 99 percent carbon and 1 to 14 percent inorganic ash identified with the

growing media. The most important aspect of the entire experiment is that the synthesis has been repeated, each time as an independent project, by a number of different scientists on the GE team, and with identical results.

Production of diamonds is only part of the success story that is expected to unfold as a result of man's taming of enormous pressures under great heat. What this achievement may mean to the future of general scientific research is perhaps best foretold by Dr. Percy Bridgman, of Harvard, the Nobel Prize winning physicist:

"The field of high temperatures and high pressure opened up by the new techniques. . . is a most inviting one for exploration. It is hard to put limits on what may legitimately be anticipated here in the way of new compounds, or new alloys, or new forms of old substances. Some day we may even be able to make the super-diamond that we would get if only the atoms of carbon could be compelled to assume a closer-packed arrangement than in our present diamonds."

Dr. Leonard Carmichael, secretary of the Smithsonian Institution, in accepting the plaque and 100-carat sampling of pre-production diamonds, and noting that the container held an estimated 50,000,000 diamonds, commented:

"Our latest inventory shows that the Smithsonian has some 42,000,000 objects under its custody. So we might say that this new exhibit, which is to have an honored place in our Hall of Minerals, will more than double the Institution's vast inventory!"



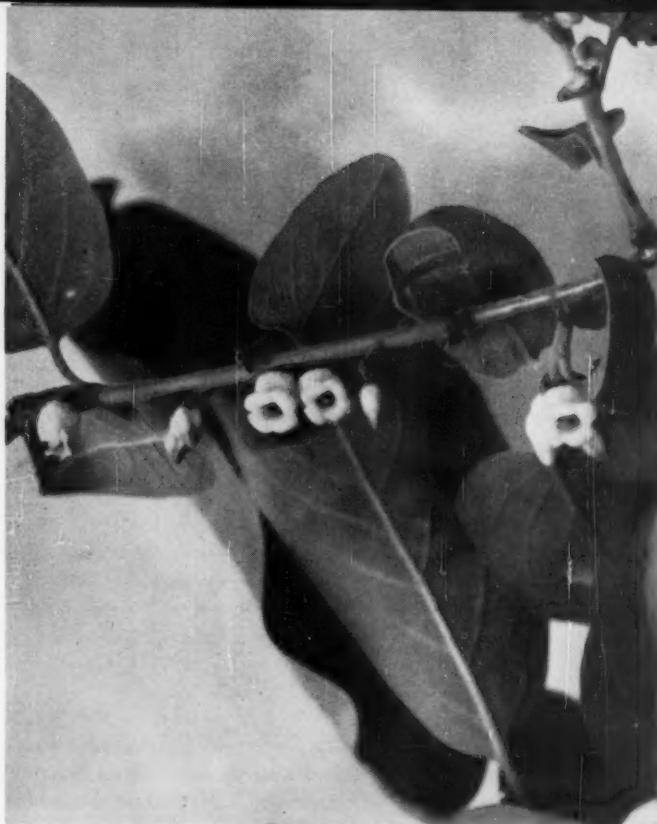
SUMMER ASTRONOMER

*One half the sky I know by heart —
The summer half; for I can trace
Where Sagittarius throws his dart;
Where Scorpius, like a diamond strand,
Fondled and slid from gentle hand,
Curls with a careless grace;*

*Where, at the center of the sky,
White Vega burns, round which the Swan
Lazily drifts with peering eye.
Nearby, inverted Hercules
Hangs with his club from bended knees
With Serpens just beyond.*

*Arcturus, faithful orange light,
Mute guide to ancient wanderer,
I quickly find in summer's night.
But winter's sky remains to me
A multi-sequined mystery.
Summer astronomer.*

Barbara Duniway



*Of ancient lineage, and
one of the ebonies, is—*

By RALPH J. and MILDRED L.
DONAHUE

The flowers of the persimmon are small, waxy and creamy white, with a touch of purple within. They are often overlooked among the leaves in spring. Male and female blossoms are borne on different trees and are pollinated by insects.

PERHAPS no other wild tree better fills its ecological niche, in the area in which it thrives, than the common persimmon, *Diospyros virginiana*. Many mammals and birds place its flat-seeded drupes on their late-season diet. Indeed, persimmons are so loved by the opossum that, in some sections, they are called "possum plums," or, less frequently, "possum apples." Other animals that find its fruit palatable include the raccoon, flying squirrel, coyote, hog, deer, fox, skunk, and domestic cattle. Starlings, jays and crows have been observed picking at the dried persimmons still on the branches in mid-January; quail, woodpeckers, titmice and chickadees, in winter, seem to find something in them of edible value.

Although presently without great economic importance, the persimmon did supply the Indians with a "cake" made from its pulp. The early settlers, too, made from the fruit a dish resembling the plum pudding of Old England. Louisiana Creoles made a loaf—sweetened lightbread—into which they mixed, before baking, the strained meat of this fruit. There is a recipe for "pumpkin pie," made entirely of yams, overtopped with granulated persimmon

and sugar, that has been declared superb by gourmets.

To many palates, the nectar of this grayish-orange fruit, when thoroughly ripened, is deliciously different and superior. In fact, its generic name, *Diospyros*, means "fruit of Zeus." However, although the taste of the first few persimmons is exquisite, after downing the fourth or fifth one, each succeeding bite grows less tasty, until all desire for persimmons is over. This may be Nature's way of keeping an animal from being a glutton.

The withering, astringent effect on one's tastebuds, following the sampling of an unripe persimmon, is an experience not soon forgotten. Captain John Smith voiced a European's first impression of this peculiarity: "If it be not ripe" he wrote of the persimmon, "it will draw a man's mouth awrie with much torment." None since, it is believed, has disagreed with him.

Botanists have placed the persimmon tree with the small tropical family, *Ebenaceae*. Its nearest relative is the hard, dark-wooded ebony. Persimmon wood, itself, is flinty and heavy, but does not last long when in the ground; fence posts of it will hardly last the season. Yet the wood is not



When the leaves fall the fruits of the persimmon are revealed.

The Persimmon

The fruits of the common persimmon are favored by many creatures of the fields and woods, as well as by humans who have learned the secret of when to eat them. Prof. Ronald L. McGregor, University of Kansas botanist, identifies these as *Diospyros virginiana*.



without its commercial worth. Textile shuttles and golf clubs are made from the heart-wood of this tree, as are billiard cues.

Whatever the value placed on its wood or fruit, the persimmon belongs to one of the arboreal "first families" in this hemisphere. It had its beginning during the Cretaceous Period, and has come down to the present day without greatly altering its appearance. *D. virginiana* is found, except in higher elevations, from Connecticut to south Florida, west to central Kansas and to Texas.

The average height of a persimmon tree is about twenty feet, but many are shrubby. There is a giant reported from near Luxora, Arkansas, that is 130 feet high, with a girth of twenty-two feet. The bark of a persimmon tree is dark brown, deeply divided into small, square blocks. The leaves are elliptical or oval, and up to six inches long. They turn golden quite early in the season and, falling, leave the yet-clinging fruit exposed on the branches. In the spring, small, waxy, creamy white flowers appear, male blossoms on one tree, female blooms on another.

Whatever may be the farm boy's pleasure in the fruit of the persimmon, the tree that produces it often causes him extra labor. Persimmon sprouts from underground runners are encroachers on his fields, and must be continually fought to prevent them from taking over. On

days too wet for hoeing or plowing, when he might otherwise be idle, or go fishing, there are always these sprouts to be grubbed out. And although it is quite a trick successfully to transplant a persimmon tree, due to a taproot that reaches Chinaward, when once the tree gets a start, it is really hard to kill.

Because the persimmon tree has always been with us, it is not surprising that, through the years, certain myths have sprung up about it. During our early youth, in Texas, we suffered "chills and fevers," which neighbors said was the direct result of eating lowland persimmons before they were thoroughly frosted. The teeming swarms of local mosquitoes were not then thought to be to blame!

Yet another belief arises from the idea that a persimmon tree must not only be frosted but well frozen before its fruit is ripe. While it must be admitted that a more or less dehydrated persimmon, along about December, is a tasty thing, it has been our experience to pick from an early variety, long before frost, some of the most delicious of fruit.

Still, it would be well to proceed with caution in eating early ripening persimmons. Certain of the orange-colored globes can fool a person, and the possibilities attending the biting of even a half-ripe persimmon are many, varied, and all unpleasant!



WASP NEST IN FALL

Here is an empty citadel;
Its garrison is lost.

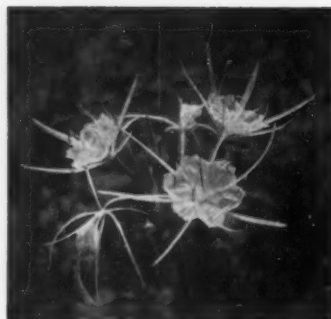
Not through the fortunes of red war,
But by the kiss of frost.

May Allread Baker



"There are so many bends in the bayou that even today one thinks he has come to the end of the stream at almost every stretch, when it appears that the trees close in and a boat can go no further."

"The tropical white amaryllis, the spider lily, is fragrant as moon flowers on a June evening."



Continuity on Bayou Contraband

BAYOU Contraband in southwestern Louisiana may have been discovered by Jean Lafitte, the gentleman pirate, back in the years between 1810 and 1815, when he was often in dire need of a hiding place. Yet the bayou, more than likely, was known long before that by the Attakapas Indians, whose hunting grounds lay steaming in the southern sunshine, with the winding length of the bayou running through them. Paddling their dugouts, the Attakapas, who, other tribes said, were man-eaters, may have come one day out of the broader reaches of the Calcasieu River, and may have explored wonderingly the length of the strange, quiet, brooding, mysterious, ever-winding tributary.

A bayou, a peculiarly southern and Louisianian institution, is a stream without perceptible current, a quiet, nearly-at-sea-level tributary of a river. The bayou is part of the intricate network of drainage waterways that are characteristic of the broad low-country marshes of Louisiana. The word itself comes from the Choctaw *bayuk*, meaning a small river, a secondary stream with a slow, hardly visible current.

Whoever may have discovered it, Bayou Contraband evidently took its name from the habits of that certain Monsieur Jean Lafitte who, with his henchmen, ranged the waters of the Gulf of Mexico and the hidden passageways of bayou and river of coastal Louisiana, from the

Mississippi to the Sabine. He found it a simple matter, when things got too hot for him out on the open Gulf, or even in the better known Barataria country near New Orleans, to sail his ships up the deep waters of the Calcasieu. He would go some thirty-five miles inland, pass through Lake Prien, then take an inconspicuous right-hand turn into the cypresses.

Here he could be well concealed and quite thoroughly lost until such time as it was safe to emerge. Tales were told about how Lafitte and his men—the bluff Dominique You, the sadistic Johnny Gambi, and Louis Chighizola with the split nostril—buried some of their treasure on the shores of Bayou Contraband.

It would have been an excellent hiding place for almost anything. The narrow, cypress-grown bayou was made to order for a pirate hideaway. It was deep and its trees were shadowy. There were so many bends in the bayou that even today one thinks he has come to the end of the stream at almost every stretch, when it appears that the trees close in and a boat can go no further. But the pirate ships—Lafitte preferred to call them privateers because it sounded better—silently pushed onward until they were well hidden.

For days, sometimes longer, the ships lurked among the cypresses. The water turkeys and cormorants perched about in the moss-draped trees and peered down at them, or soared high overhead in the blinding Louisiana sunshine. In the wet woods blossomed the lovely flowers of the South, the multi-hued wild irises, the fragrant white spider lilies, and many more. There were alligators among the cypress knees and palmettos, and deer, which perhaps came down to drink, warily, at dusk.

But Lafitte was not out to gather flowers, watch birds,

*Here are found Nature's unbroken
bonds with past, present and future*

By VIRGINIA S. EIFERT

Photographs by the Author

or even to shoot deer and alligators. There was a time when pursuit seemed so imminent that he arranged a bold plan by which to throw the scent away from his ships. Up along Lake Charles, where Shell Beach Drive now lies, Lafitte is said to have built a hut and to have thrown up an embankment as protection against the bombard-

ment he must have expected from Governor Claibourne's men. Next he ordered all the gold and other treasure to be taken from one of his schooners, and had the ship brought up to Lake Charles. Here he proceeded ruthlessly to fire a cannon at it until, filled with holes, it sank in the lake. If Claibourne's officers found it there, they were to have inferred that the ship had gone down with all hands aboard, including the notorious leader.

Bayou Contraband not only keeps its buccaneering name, but the legend of buried treasure still persists strongly enough to urge people, from time to time, to dig futile holes along its wooded shores in the hope of finding some of Lafitte's illicit loot. Although no treasure to date has been located, the shining stream keeps much of the same character that Lafitte, Baron of the Bayous, knew so long ago, and which is its true and never-lost wealth.

The area lies between the city of Lake Charles, one of the three deep-water seaports in Louisiana, and the tremendous, thundering layout of the Cities Service Refinery on the Calcasieu River. A portion of the bayou now passes through the newer outskirts of the handsome city of Lake Charles itself, thirteen feet above sea-level. At this point the shores contain surprising glimpses of fine homes built to fit the landscape. They are remarkably unobtrusive and actually occupy but a small part of



Bald cypresses draped with Spanish moss stand in the quiet waters of Bayou Contraband. The cypresses seem to connect sky with earth by means of the filaments of moss, which hang low from them.

Louisiana is noted for its wild irises, which include many variations of great beauty

the remaining wilderness acres of cypress swamp and typical Louisiana forest.

Although Bayou Contraband lies only a scant forty miles from the Texas border, few evidences of a more arid, western character are visible. In drier land nearby, and along the nearby Intracoastal Waterway, however, one is constantly reminded of the Texas country by massive, humped Brahma cattle, clumps of prickly pear, and armadillos. On Bayou Contraband, the world is still subtropical. Only an occasional cat's-claw bush proves that the West is really close at hand.

In the damp earth just above where the cypresses stand with their roots submerged, irises and lilies put forth spectacular blossoms, which are at their best in April and May. Louisiana is especially noted for its wild irises, which include unnamed subspecies and puzzling variations of great beauty. Perhaps half a dozen of these, ranging in color from a curious purplish copper-red, to a glorious ultramarine and several shades of lavender, grow under the cypresses and up to the edge of the woods. With them stand regal clumps of that tropical white amaryllis, the spider lily, *Hymenocallis*, fragrant as moon flowers on a June evening, tenuous and exciting as a jungle orchid. The spider lily has six narrow flower segments connected in the center by a flaring white cup. From the bud cluster at the summit

of the stout column of stem, new flowers open each day; each plant may produce blossoms for a week or two. Their fragrance, although noticeable enough in daylight, is strong and urgent as dusk comes on.

With these marsh dwellers are the big peltate leaves of tuckahoe or arrow arum, the narrow spears of *Thalia*, and a tangle of razor-toothed catbrier inconspicuously binding together the fabric of the lowland and laying a snare for unwary ankles. And, at the edge, between woods and swamp, are the large, fragrant, silvery purple bells of *Clematis crispa*, which weave together the two environments above the bayou.

The cypresses themselves connect sky with earth by means of filaments of Spanish moss. Because the moss hangs so low, touching the stiff palmetto fans, it leads the eye from contemplation of flowers on the ground up to the heights of sun-filled moss where a parula warbler's ascending buzz may indicate a nest hidden in that same gray tangle. Southern-voiced chickadees, the Carolina variety with the four-note whistle, flit from the cypresses to the long-leaved pines higher in the woods, and back again. Overhead, a flight of brown pelicans passes over on a short-cut to Calcasieu Lake, and a mockingbird in a hackberry tip splatters music all over the April morning.

Although the swamp merges so imperceptibly with the woods that one is scarcely aware of any dividing line, the woods themselves above Bayou Contraband are as different in character as cypresses are different from pines. From their fallen needles rises a resinous aroma, and down among those needles is a thick carpeting of creeping partridge berry, *Mitchella*, in full bloom in April, bright with scarlet fruits in summer. To one who is accustomed to associate partridge berry with white pine forests of the North Woods, this may seem a curious sort of plant misplacement. Still, the habit of partridge berry is to grow in pine woods, which may be excuse enough for finding it so much a part of haunts that are only a few miles from salt marshes, palmettos, and the Gulf of Mexico.

These wild things—the trees, birds, mammals, and the bayou waters themselves—are the unbroken bond, the link of continuity, that connect the past with the present, and with the future. Perhaps this philosophical



Cormorants perching in dead cypresses along the Lake Charles Ship Canal, just off Bayou Contraband, where higher water killed the trees.

truth is a reasonable argument in favor of conservation of wild areas such as this, of leaving certain lone, lovely, useless, tangled wilderness spots as an assurance of man's own continuity. The impact is so plain, seen from this viewpoint along little Bayou Contraband. In this virtually unknown and insignificant stream, easing along through its cypresses, coming from nowhere, going nowhere, yet part of the land, part of the picture of southwestern Louisiana, the feeling of timelessness is most evident.

For these cypresses are descended from those which hid Lafitte's pirate ships. These beautiful irises and spider lilies have sprung from ancestors that blossomed just so when the Attakapas came spearing alligators along this bayou. The black vulture, peering like a curious dark gnome from the cypresses and moss, is kin to vultures that peered down on Johnny Gambi and Dominique You as they buried treasure from the ship Lafitte was going to sink. Rows of cormorants, perching like black candles on the free-form candelabrum of a dead cypress, or water turkeys holding their wings spread wide to the sunlight, did so in the days when the Alibamon and Coushatta people hunted here. Up in a nest in a live oak, fish crows argue in weak voices as fish crows in the past argued and squeaked, while gold and blue parula warblers still nest in Spanish moss, as parulas have nested for a long, long time, perhaps even before there were men. The cottonmouth moccasin draped over a cypress snag is one with all those other moccasin

which have menaced the young in the redwings' nest or startled a man who suddenly came upon it. The snake, like the pirates and the parula warblers, is part of the bayou country, spicing its beauty with the danger that is an ingredient of wilderness. And in April, when the partridge berry is blooming again, there pass through these woods once more, connecting north with south, and spring with spring, migrants heading for more northern forests. There are white-throated sparrows going to Canada, where *Mitchella* will not bloom until July; black-throated green warblers bound for Minnesota hemlocks; ovenbirds heading for Ontario aspens. Along the bayou, in swamp, in woods, and in water, this bond of continuity each year is bright and somehow reassuring to all who see it there.





PHOTOGRAPH BY MAURICE BROWN

Migrating hawks ride the air currents as they pass on their way southward, following the mountain ridges in September and October.

The Battle in the Air—1756

By JOHN B. MAY

"THIS may be depended on, 20 being present." So ends the brief but intriguing description of a strange aerial event, as reported by an anonymous correspondent and published just two centuries ago in the *New Hampshire Gazette* of October 11, 1756. The article is short enough to be quoted in full:

"20 or 21st of Sept. There were seen near Fort Dummer the greatest Phenomenon that was ever seen in New England. Two large companies of Pigeon Hawks, judged to be about 4,000 in number, headed by 2 large Eagles, one Eagle heading one company and the other Eagle the other. They found themselves too large for 2 companies and so divided into 4 Battalions. They fought over from Fort Huddell to Fort Dummer, and fighting and fighting over and under one another from 1 fort to the other for 4 hours, till one company conquered the other and chas'd after them.

This may be depended on, 20 being present."

This paragraph, on the yellowed page of an ancient news sheet, instantly stirred my curiosity and started me on a wild goose chase (or, rather, a wild hawk chase) in an attempt to localize and explain the "greatest Phenomenon." Just what basis could there have been for this news item, obviously not published as fiction, and how can we interpret it in the light of present day ornithological knowledge?

Fort Dummer was easily located, for it was an important outpost in the French and Indian Wars. It was

erected in 1724, one of a chain of eight forts, or stockaded block-houses, extending from near what is now Brattleboro, Vermont, to the Hoosac River near Williamstown, in Massachusetts, designed for the protection of settlers south and east of that region. It was built by the Province of Massachusetts Bay on land that is now included in the State of Vermont, but which was then known as "the New Hampshire Grants." After the close of the Seven Years War between Great Britain and France, it was dismantled, in 1763, by the Province of New Hampshire, as no longer needed for defense. The site of Fort Dummer, a few miles south of Brattleboro, was long marked by a commemorative boulder and bronze tablet, but the fort area is now under water and the marker is 2200 feet from its original location.

Finding Fort Huddell was a different proposition. I visited various towns in the neighborhood, consulted histories and Indian War records, without finding a trace of any fort of that name, or even of an early settler whose loop-holed log home might have been used as a refuge place in case of attack. Finally, in the *History of Cheshire and Sullivan Counties, New Hampshire*, it was recorded that in 1742 Col. Ebenezer Hinsdell built a fort and grist mill "on Ash Swamp Brook, north of Merry's Meadow." This early spelling of the name of the family for whom the town, Hinsdale, New Hampshire, was named, caught my attention. Could the *Gazette's* typesetter have misread "Huddell" for "Hinsdell," an easy error

when one considers the poor handwriting current in those days, and the use of the archaic letter S in the scribbled note of our anonymous reporter? Ash Swamp Brook in Hinsdale was quickly located, and on a low bluff overlooking the broad Connecticut River meadows was an inconspicuous marker. It was a little down river from the site of Fort Dummer, and commanded sweeping views up and down the valley and to the Green Mountains of Vermont opposite.

Now for the "battle." Might it not have been merely the milling about overhead, of migrating birds? The dates give us our first clue, "20 or 21st of Sept." Maurice Broun, director of Hawk Mountain Sanctuary in Pennsylvania, in his book *Hawks Aloft*, names the period between September 15 and 25 as that of the most spectacular migration of hawks, and the broad-winged hawk forms by far the largest flights witnessed at that observation point. On September 16, 1948, more than ten thousand broad-wings were counted passing the Lookout at Hawk Mountain. As Dr. Broun expressed it, "the sky was literally darkened by broad-wings, giving a glimpse of the way it must have been any mid-September day a couple of centuries ago. . . Soon after 11 o'clock a swirling mass of broad-wings boiled over the mountain and they soon filled the southern sky in a seemingly interminable densely straggling line, moving rapidly. . . a level mass of moving birds as far to the south as I could see." How easily that might have been interpreted as a "battle" by a non-scientific observer!

In recent years we have learned that many birds (and especially hawks) in migration take advantage of favoring air currents to help them along on their annual flights. Hawk Mountain Sanctuary has given us much pertinent data on this subject. It is located on the Kittatinny Ridge, well named by the Indians, "the Endless Mountain," for it runs from the north across the entire Commonwealth of Pennsylvania, trending a little west of south in its course. When winds from the northwest sweep across the Little Schuylkill, a thousand feet below the Lookout, and hit this ridge, they are deflected upwards and make ideal conditions for the migrating birds who sail along on the up-currents or "thermals" for miles and miles with almost no movement of their wide-spread wings. Does such a condition apply to the region near Fort Dummer?

Directly across the Connecticut River from Brattleboro is Wantastiquet Mountain, a long north-south ridge that rises precipitously some eleven hundred feet

above the valley floor. For a hundred miles north of that point the river varies barely five miles from a straight line almost due south, and it is unquestionably a fine direction pointer or guide for migrants of many species. At Brattleboro the river makes a sudden bend toward the southeast until it reaches the Massachusetts

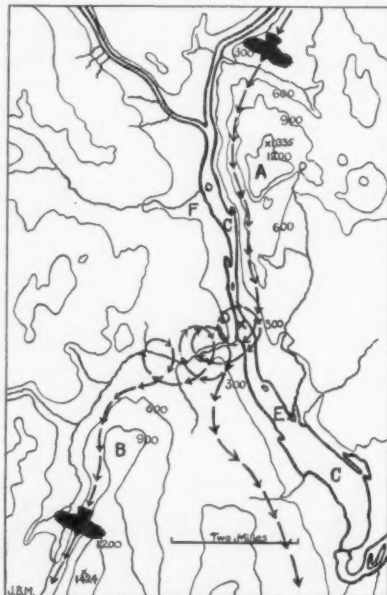
line at Northfield. On the New Hampshire side of the valley are low lands where the Ashuelot River enters the Connecticut at Hinsdale, but a few miles to the westward, in Guilford, Vermont, East Mountain, another long north-south ridge, rises nine hundred feet above the bed of Broad Brook. Wantastiquet and East Mountains, with their long precipitous slopes facing the west or northwest winds, should furnish ideal soaring conditions for the migrating hawks, but between them is a gap of five or six miles, the fertile valley of the Connecticut River.

Put yourself in the position of the writer of 1756. A great flight of broad-winged hawks, sailing down from the north on the strong up-currents or thermals and following the course of the wide stream, pauses in confusion as Wantastiquet ends above the meadows, and the air currents fail them over Ash Swamp Brook. The air is full of milling broad-wings, rising in long spirals or diving downwards over the river meadows as they search for favorable gliding conditions,

thousands of them, with perhaps a few scores of red-shoulders and red-tails, and a couple of great bald eagles "heading" the "armies" as they mill about. Then they find the thermals rising over East Mountain and, taking advantage of them, sail off toward the south, disappearing into the distance where "one company conquered the other and chas'd after them." There is no mention of dead or wounded birds hurtling earthwards as there would have been, undoubtedly, had this really been a battle and not a normal migration maneuver.

Similar hawk concentrations could be witnessed, even in recent years, at favorable locations like Cape May Point in New Jersey, Point Pelee on Lake Ontario, and, best of all, at Hawk Mountain Sanctuary in Pennsylvania. A visit to Hawk Mountain in mid-September is a "must."

But there were sceptics, even in colonial New England, so our reporter calls on force of numbers to confirm his observations, "This may be depended on, 20 being present." Twenty eye witnesses, one reporter, and the first published reference to the great "hawk flyway" that we are studying today!



The aerial "battleground" of 1756. (A)—Wantastiquet Mountain, 1335 feet. (B)—East Mountain, 1424 feet. (C)—Connecticut River, 235 feet. (D)—Fort Dummer. (E)—Fort Hinsdell (Huddell). (F)—Brattleboro, Vermont. Figures indicate contour altitude in feet above sea level. Arrows indicate probable line of flight.

Found nowhere else in the world is the

Altamaha's Spiny Mussel

By IVAN R. TOMKINS

Photographs by the Author

IT was about 125 years ago that Major LeConte (probably John Eatton LeConte) found a curious spiny mussel in the lower Altamaha River, in Georgia, near Hopeton Plantation, which was then owned by James Hamilton Couper, himself a famous conchologist. Perhaps Couper shared in the discovery, but LeConte got the credit from Thomas Say, who published the original description under the name of *Unio spinosus*. In later years, with a better understanding of the fresh-water mussels, the generic name was changed to *Elliptio*.

After that first discovery little seems to be known of

might easily have forgotten the exact locality. There seems to be only one other similar mollusk in the world, a smaller species found in a portion of the James River in Virginia.

Any naturalist will realize my feeling on stumbling upon this strange shell in October, 1954. It was luck, indeed. My own knowledge of mollusks is slight, but long ago Dr. Francis Harper alerted me to keep a watch for *spinosus*, when he was following the Bartram trail through Georgia. Again, it was luck that took me to the Altamaha every week or so from October to Febru-



Thought by many to be extinct, the curious spiny mussel was rediscovered by the author in 1954. Here are three typical specimens of this exclusively Georgian shell.

this mollusk. Indeed, letters from some of the present day authorities have indicated that it was thought to be extinct, and few specimens have existed prior to its rediscovery in the autumn of 1954. This recent finding places beyond question the mollusk's presence in some numbers in the Altamaha—and it is found nowhere else in the world.

About fifty years before LeConte's discovery, William Bartram had written of a "knobbed muscle," giving the locality as the mouth of the Mississippi River. It is now believed by some that the *Travels of William Bartram* were written some time after his return to Philadelphia, and that he had actually seen it in the Altamaha, a stream he crossed several times, and near which he spent two months with a fever in 1773. No one else seems to have found anything similar in the Mississippi, and Bartram was there only briefly. He

ary, to visit a snagboat of the U.S. Army Corps of Engineers, which was clearing the river of snags and fallen trees for navigation.

The summer of 1954 was very dry, and the river was at an all-time low. By October the gauge at Doctortown, sixty-two miles above the mouth, was 1.5 feet below normal summer low water, and the river flow dropped to 1390 second feet. The water was quite clear for this murky, often muddy stream, and the conditions for finding mussels better than might be expected for many years again.

My first trip was on October 19, and the snagboat was in the vicinity of old Fort Barrington, the ferrying point for most of the coastal travel since colonial days, and probably the site of an Indian crossing far more ancient. Captain Craven and I went across to a nearby sandbar, and the very first mussel shell I turned over had

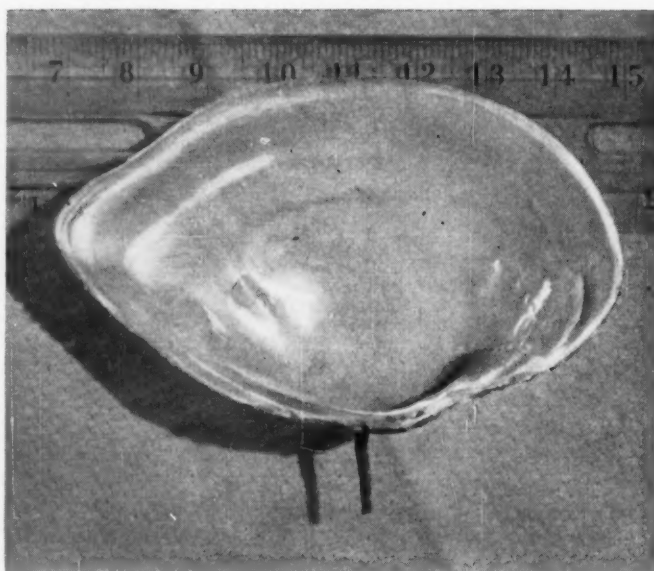
spines on the back, something I had never expected to see! We gathered a half dozen pairs of valves and a few odd ones, and Captain Craven waded out in a foot of water and kicked a live one ashore. Later on two more live specimens were found, but nothing like a bed of them. They must be nearby somewhere, I reasoned, perhaps in the "Lakes," as the dead rivers are called locally, or maybe in one of the small tributaries.

A month later, Herman Coolidge and I took a boat from a fishing camp a few miles below and spent a day on the river. We came home with a box full of shells, picked up on the sandbars, or raked out from a foot of water, but no live ones. As the snagboat worked her way upstream I visited it frequently and always tried to stop on a new sandbar or so each trip.

The Altamaha is the southernmost river of the Atlantic coast of the United States that habitually carries heavy loads of silt and mud from the Piedmont to the sea. It has a true delta at the mouth, quite different from the neighboring St. Marys, Satilla and Ogeechee rivers, which carry "black water" from the Coastal Plain; empty into the ocean, each through a gorge; and are not subject to heavy floods.

Everyone speculates about the spines, their origin and use. The more objective naturalist will ask, "What is their function?" Apparently the spines arise as something like a nacre-lined tube, which fills at maturity. Some of them with broken tips seem to be tubes, and the inner opening is often produced some distance down inside, as shown in the photograph. Sir Charles Lyell, the eminent geologist, in writing of his second visit to the United States in the 1840's, wrote:

"Mr. Couper has already discovered in the Altamaha no less than sixteen species (Mollusks before unknown, one of these *Unio spinosus* has a singular appearance,



Closeup view of one valve of the spiny mussel, *Elliptio spinosus*, from the Altamaha River. The reason for the spines is a matter of conjecture.

being armed with spines, standing out from the shell; and probably acting as a defense against some enemy."

William Bartram, writing of his "knobbed muscle," speculates that the spines serve as "grapnels to hold against the swift currents." To my mind, an alternative thought would be that the tubular spines admit water and prevent smothering if the mussel is suddenly covered with silt or mud. Perhaps none of these is the answer.

There may be from one to four spines on each valve, and there may be more on one valve than the other, yet in the same general location on the shell. The spines may be 20 millimeters long. Shells have been found that were 116 millimeters long, but the average runs about 57 millimeters.



THIS FOR REMEMBRANCE

*Weary, I lay on silver sands
And let the cleansing ocean breeze
Blow away the world's demands
And cool my heart's hot urgencies.*

*I watched the gulls on stately wing
Gliding past, and I could hear
The endless, cadenced murmuring
Of sapphire waves that ventured near.*

*How long I slept I could not tell
But when I woke, my cure complete,
The sea had laid a tiny shell,
Like a blue jewel, at my feet.*

Ruth Seymour Vesely



The Living Wreck

By WILLIAM HOPKINS AMOS

Photographs by the Author

TWELVE years ago a burning coal barge was beached on the shores of an ocean bay on the coast of Delaware. Since then, pounding surf and the work of small animals have reduced much of it to bare deck and ribs, but many of the great hand-hewn timbers are intact and provide home for many marine plants and animals.

During the years this hulk has rested on the beach, a variety of creatures have found residence in it or on it. While seasonal changes in populations of animals are evident, there are more lasting changes in which one animal species succeeds another on the barge by dominating it or crowding it out.

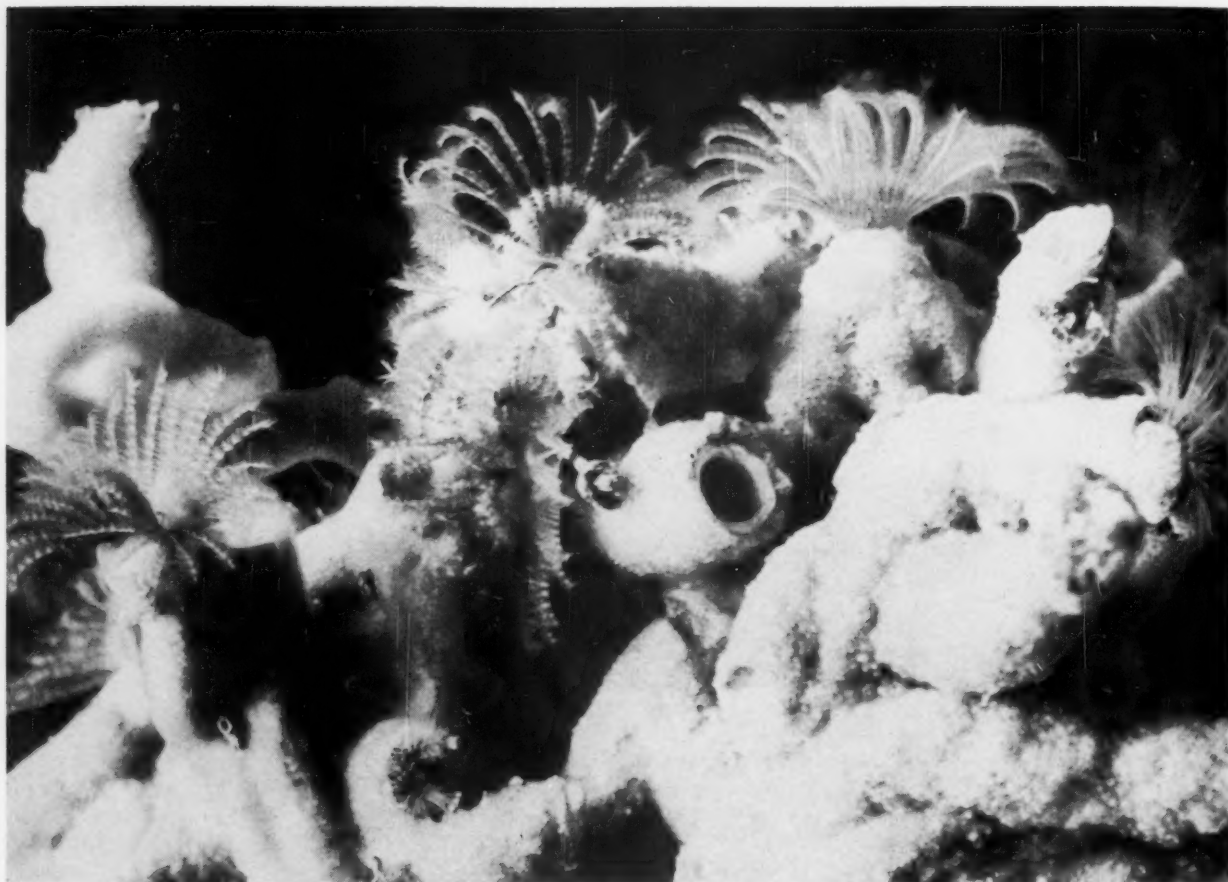
Any exposed surface in marine waters is a favorable settling place for sessile animals, those that are not free to move about. A two-hundred-foot barge constitutes an entire new world. Bacteria settle first, and within hours. They are followed shortly by single-celled animals and plants. Within weeks these early populations have declined and larger forms begin to take over. Moss animals, hydrozoans and sea lettuce appear next, with a scattering of sea anemones and barnacles. After a period of a month or two, a more stable population develops. Moss animals may dominate for a long time, sea squirts can cover areas for years, barnacles crowd each other for space. Nevertheless, there is usually one final victor in this kind of environment, although many years may pass until it succeeds in crowding out the others. The victor is usually a bivalve mollusk, sometimes the oyster, but more frequently the tenacious, hardy mussel, which can withstand exposure and severe conditions better than most of the animals that have come before it in this habitat.

There are many exceptions to this general pattern, but for those seaside residents who have the opportunity to observe fixed spots from time to time, a study of the succession of animals can be a fascinating pastime. Furthermore, observations of lasting importance are possible, since comparatively little is known about biological successions in marine waters.

Animals and plants of the types pictured here settle and grow upon all permanent natural objects, and are found in abundance along rocky shores. They also inhabit wharf pilings, where they have little adverse effect unless they belong to a boring species. A small bivalve mollusk, the shipworm, and a boring shrimp, however, account for the loss of much submerged wood, including pilings and wooden ships.

Perhaps the greatest economic result of small, attaching creatures is not destruction, but obstruction. Some cover highly desirable oyster beds and lobster feeding grounds. Others settle on the submerged hulls of ships and grow luxuriantly. They cannot damage the steel directly, but they may remove the paint, allowing the corrosive action of salt water to eat away the metal. More than this, they interrupt the streamlines of the hull to such an extent that a ship's speed may be reduced by a third, and its fuel consumption increased by fifty percent. This is costly in any case, and dangerous to the maneuverability of vessels.

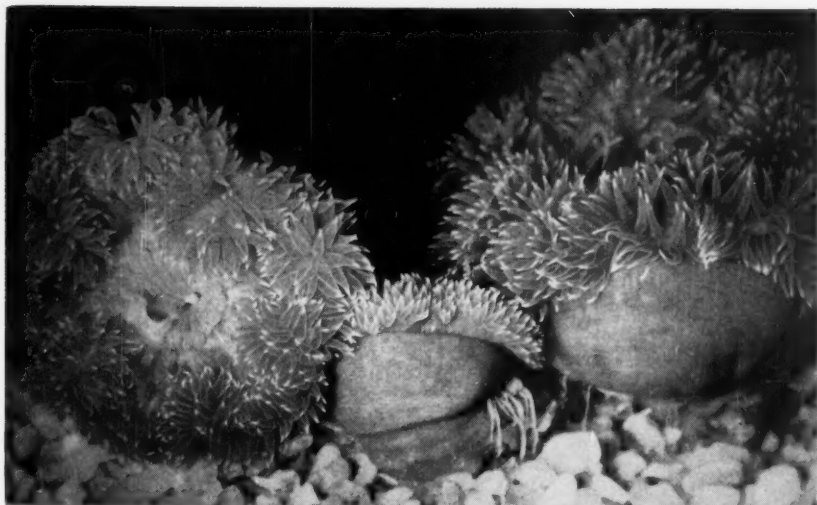
An old wreck is a fine natural laboratory where the lives of attaching organisms can be studied. With further knowledge, there can be more appreciation of the biology of these strange creatures, and more effective controls can be exercised upon their destructive habits.



Great clusters of lime tubes are attached to the barge below the low tide mark. The tubes are built by feather-duster worms, *Hydrozoa*, which extend tentacles to attract and capture food. Other creatures live in vacated tubes. Covering the colony with a cobblestone effect are groups of moss animals, *Membranipora*.

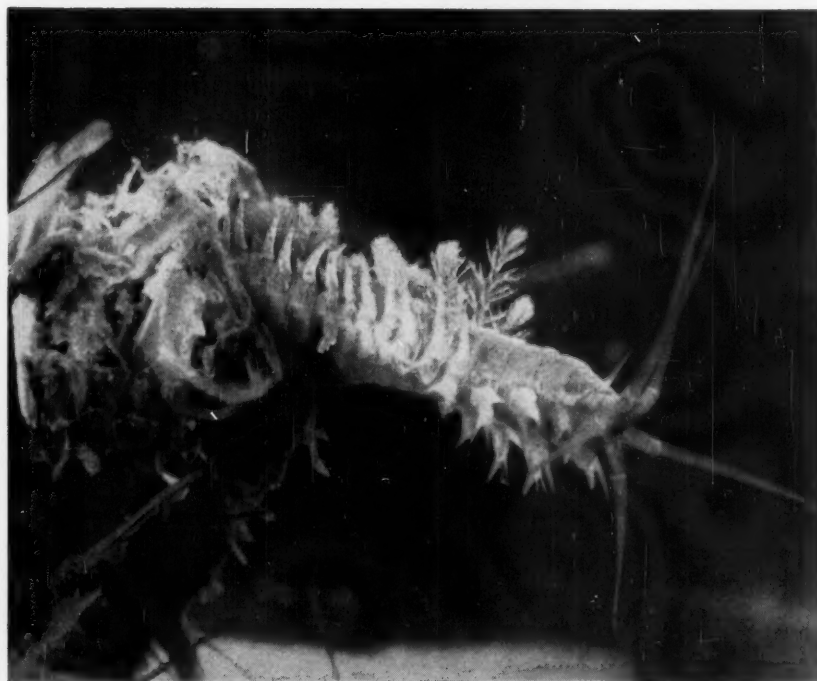
Much of the outer hull is covered with what fisherman call "grass," (left, below). This is actually not a plant but several different species of hydrozoan colonies. A colony consists of hundreds of individual animals, each of which extends a circlet of tentacles. Small anemones, *Diadumene*, (center, below) are scattered about on clusters of feather-duster worm tubes. Into the mouth are thrust any items of food captured by the tentacles. As the waves surge in and out the white anemone, *Diadumene leucolena*, (right, below), stretches forth its tentacles in a poisonous snare.





Large red anemones, *Metridium dianthus*, are attached to plankton in deeper water. Their numerous tentacles capture microscopic drifting life as it is carried past.

A zebra-striped flatworm, *Stylochus zebra*, can be found creeping through hydrozoan colonies or across the quiet sandy bottom inside the wreck.

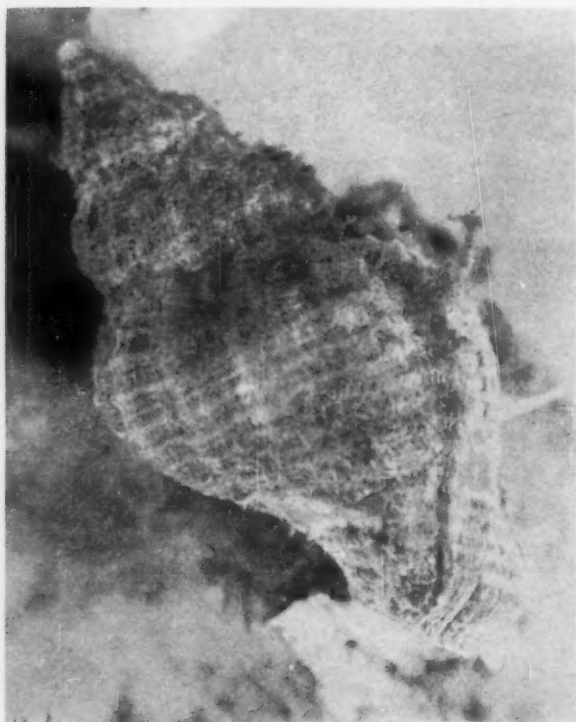


Where a considerable amount of sand has piled in the hold of the barge, tubes can be seen rising into the clear water, each covered with bits of debris. The worm that inhabits these tubes, *Diopatra*, has a complex series of appendages, tentacles and tree-like gills.



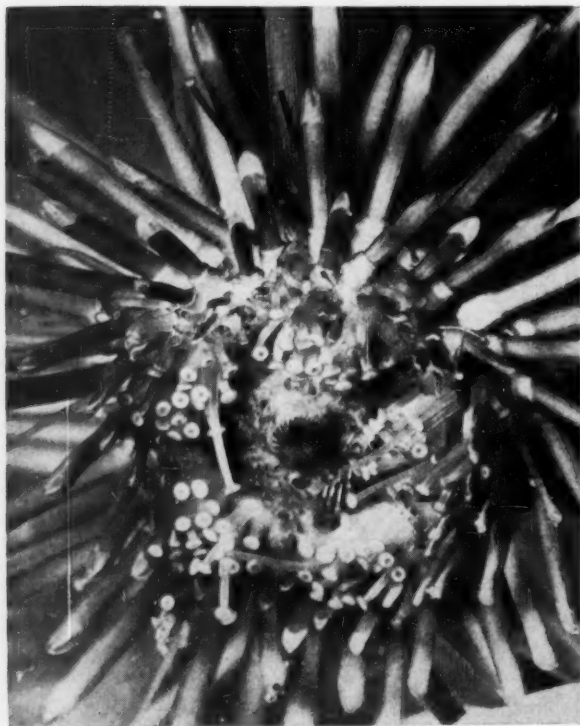
Horseshoe crab eggs sometimes are found in protected regions of the hull. The active embryos can be seen wriggling about within their transparent membranes.

The oyster drill, *Urosalpinx*, is a predatory snail that destroys quantities of young oysters and other mollusks.



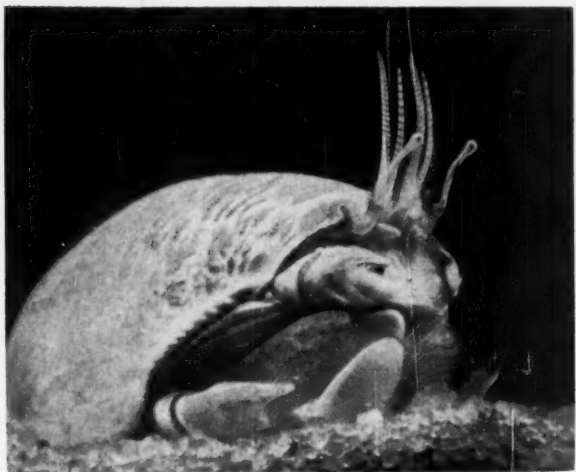
Attached to the outer end of the barge, close to the bottom, are a few small clusters of coral, *Astrangia*. This form never creates great stony masses as do its southern relatives.

When a purple starfish, *Arbacia*, wedges itself into a crack in the broken timbers, something more than a hand is needed to extract it. Not only does it exert suction with its tube feet, but the spines help to brace it securely.

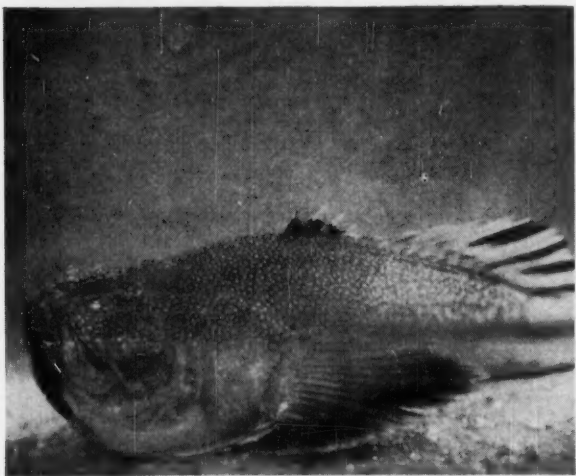




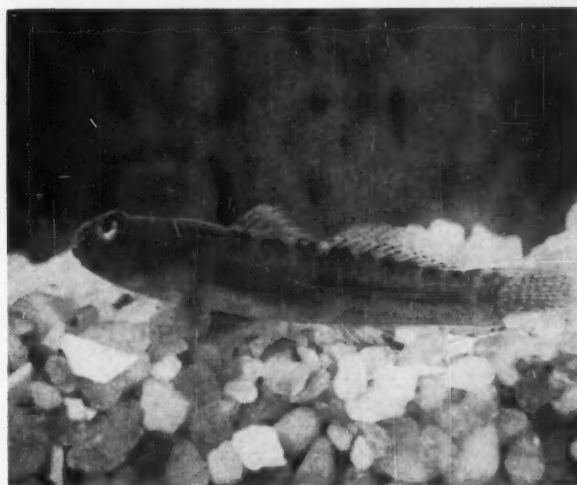
Hordes of small fiddler crabs, *Pagurus longicarpus*, scuttle through the submerged portions of this wreck. As they grow, they exchange old snail shells for larger ones.



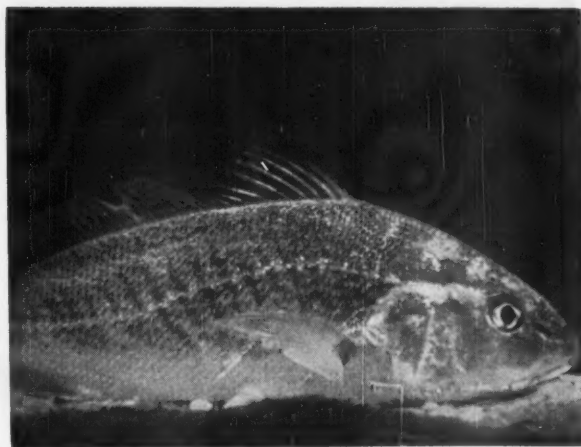
Where waves continually wash sand into the wreck may be found burrowing sand bugs, *Emerita talpoida*, which change location with the tides and feed on small animals washed in by the waves. (Below) The electric star-gazer, *Astroscopus*, is common in bays and estuaries and is found in the barge, burying itself except for its eyes, mouth and the electric patch that captures prey.

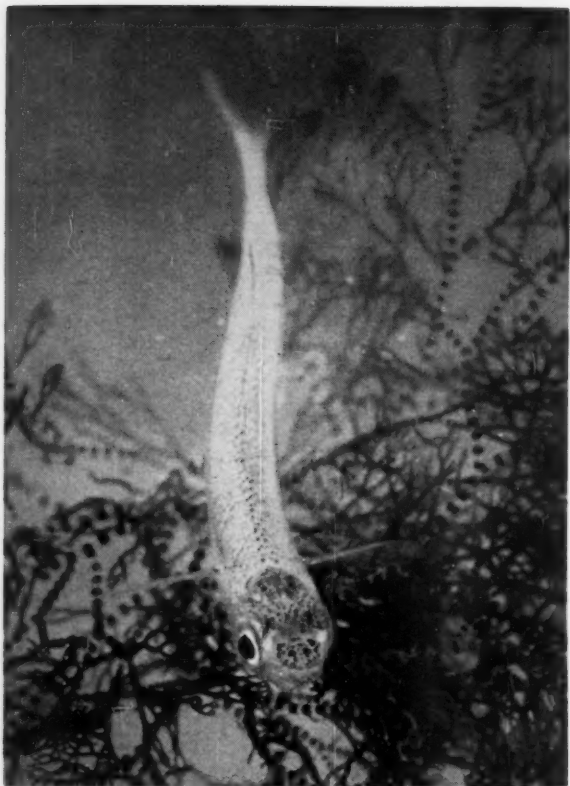


In the deeper portions of the barge's hold, buried in sand, mantis shrimps, *Chloridella*, wait with jack-knife claws ready for any passing victim.



Common in shoreline habitats are the gobies. This is a fish without scales and with some of its fins modified to form a suction disc on its undersurface. (Below) During a quiet evening, guttural, frog-like noises may rise from the depths of the barge. This means that down between the wooden ribs croakers, *Micropogon*, are feeding and calling with their characteristic grunts.





Another common fish of shoreline habitat is the blenny, which has fleshy "horns" above its eyes. It is known to science as *Hypsoblennius*.

No fish swimming through the wreck of the barge is more abundant than the little silversides, *Menidia*, seen here against a background of red seaweed.

←

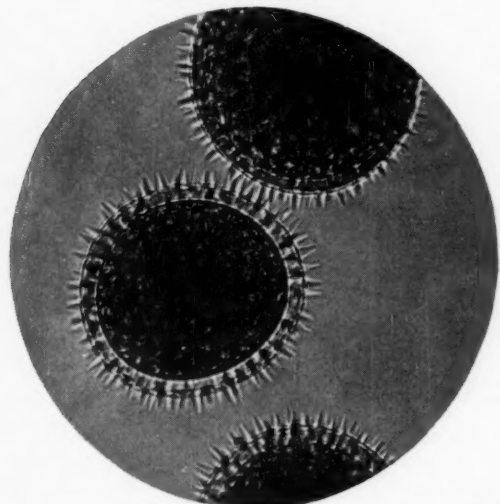
And so the tides wash through the wreck of the barge as gulls wing overhead. In the timbers of the barge dwells a fascinating and changing community of plants and animals of the shore and sea, and about which much remains to be learned.



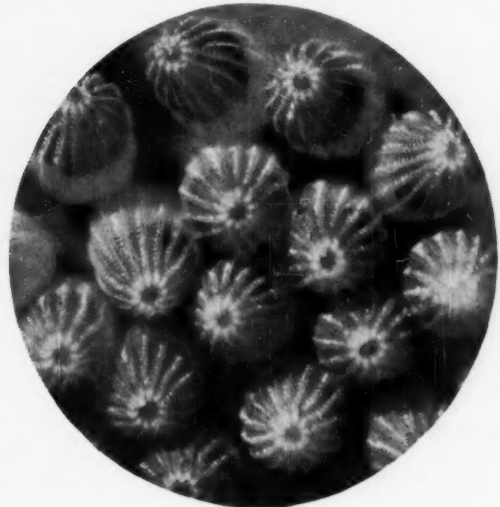
Hidden Beauty



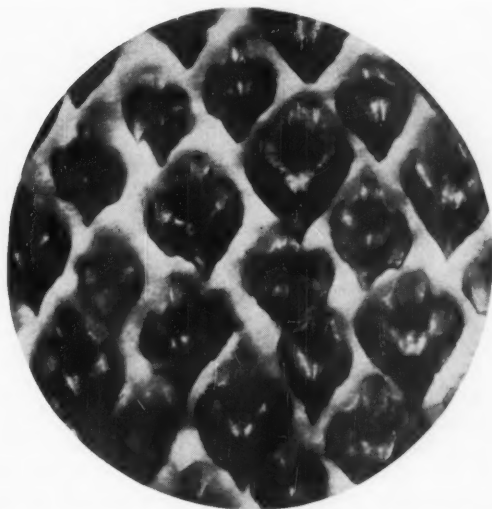
More than the unaided eye is needed to see the beauty of these hairs on the back of the caterpillar of the vapour moth.



Some of the pollen grains of mallow, here enlarged 500 times, are rimmed with spikes. (Below) Eggs of the large, white, cabbage butterfly, photographed four days after they were laid, at which time they are a butter yellow, later turning a deep brown.

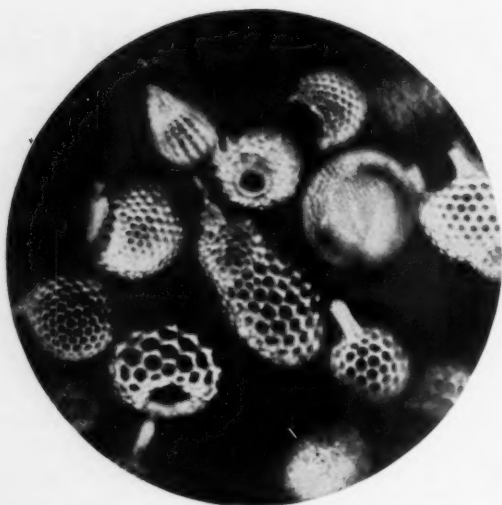


THERE are, all about us, many examples of Nature's mastery of beauty in design. Fully as much is hidden from the naked eye and revealed only through the magic of the microscope. English photographer Douglas F. Lawson went exploring in this field, and made the photomicrographs on this and the next page. There was a temptation to make a quiz of these pictures, but it is unlikely that many people would recognize the sources, and most of us would be completely frustrated by such a quiz attempt. Those who wish to try to identify the subjects may do so by forcing their eyes to stay away from the captions. ♣ ♣

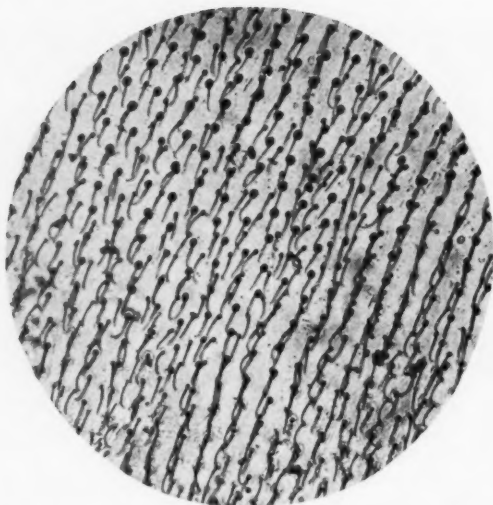


This enlargement of the piece of skin of a dog fish is an indication of why it feels rough. (Below) This photograph is of a dry mount of the down feather of a hummingbird. The area illustrated was that near the center of the feather.

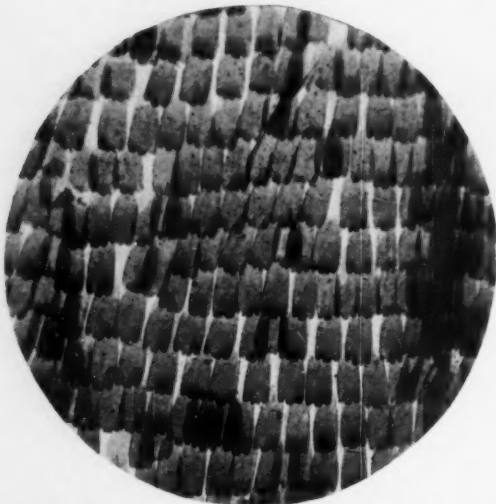




Radiolaria comprise a large group of microorganisms of which these are a sample. They have numerous holes in their beautiful hard covers.



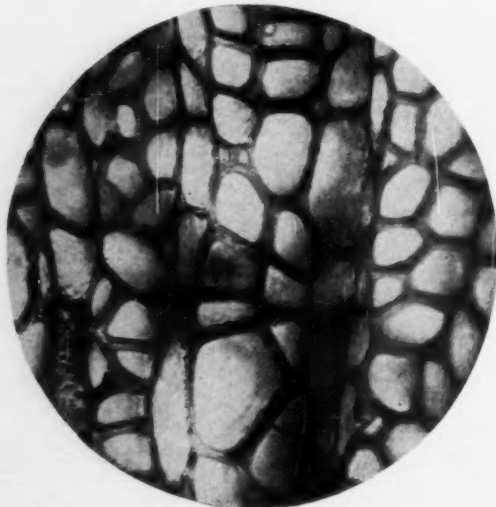
This specimen, mounted in Canada balsam, shows the minute hairs on the wing of a blowfly and can be seen only with off-center lighting.



Wing scales of moths and butterflies reveal fascinating designs, as with these of the emperor moth. (Below) This photograph of the cross-section of the root of the tobacco plant illustrates the interesting designs found in growing things.



This bit of the skin of a sole was difficult to photograph without just the right lighting. (Below) The scales of the painted lady butterfly are varied in color and in pattern. They are dry mounted and have to be photographed with oblique lighting.



International Union for Conservation

THIRTY-FIVE countries were represented by delegates or observers at the Fifth General Assembly of the International Union for the Protection of Nature in Edinburgh, Scotland, June 19 to 28. More than three hundred men and women from as far away as Japan, Australia, and South Africa, and as near as the Scottish Highlands, gathered in testimony to the fact that conservation and wise use of natural resources, protection of endangered species of birds, mammals and plants, and creation of parks and reserves for posterity know no national limitations.

One question that the Assembly faced up to—and solved—was that of a change of name. When the Union was founded at Fontainebleau, France, in 1948, it was called the International Union for the Protection of Nature because the word conservation, as we know it in the United States, is not found in various languages of Europe. Indeed, in some it suggests tinned goods, or jams and jellies. However, the concern of the Union since its inception has been for the conservation and wise use of species, areas, soil, water, forests—all renewable natural resources. Protection implies locking up, and thus was only applicable to certain phases of the Union's concern, chiefly threatened species of wildlife and areas of outstanding significance, as with our own national parks.

So, provided with a variety of suggestions, a special committee wrestled with this semantic problem. Finally it brought in to the closing general session the name International Union for Conservation of Nature and Natural Resources. This change was adopted without dissent. So far as the United States is concerned the definition of conservation provided by the words "of Nature and Natural Resources" is not regarded as essential. Elsewhere it is hoped that "conservation" will gradually come to have a place in the language and eventually not require clarification.

Four themes were covered at the several technical sessions. These were the management of Nature reserves on the basis of modern scientific knowledge; rehabilitation of areas biologically devastated by human disturbance; relationship of ecology to landscape planning; biological effects of the recent spread of myxomatosis among rabbits. Papers and reports from far and wide bearing upon each theme had been submitted prior to the General Assembly and provided each person in attendance. Thus these data were available for pre-reading and extensive discussion from the floor was possible. Not the least interesting theme, by any means, was that of the epizootic myxomatosis, which has wiped out rabbit populations with interesting and sometimes amazing effects upon vegetation, predators, grazing animals

and ecology generally. For example, with the rabbit population reduced to very few animals, certain plants, including orchids, believed extinct, reappeared.

The Proceedings of the Edinburgh assembly will later be published and thus make available a wealth of worldwide information bearing upon these important themes.

Ever since the Second General Assembly in Brussels, the Union has had a Survival Service concerned with action and education in the interest of saving seriously reduced species of birds and mammals. By action of the Edinburgh meeting this phase of the Union's activities was made a permanent commission under the leadership of Harold J. Coolidge, Jr. Another commission created was on population, headed by Fairfield Osborn, U.S.A. The Ecology Commission, established by the Fourth General Assembly, was continued under the chairmanship of M. F. Morzer-Brujijns, Netherlands. A. B. Duncan, United Kingdom, is head of the Finance Commission. Other commissions continued were Arctic Fauna, Professor Sparck of Denmark, chairman; Education, Dr. Ira Gabrielson, U.S.A., chairman; Public Information, Richard W. Westwood, U.S.A., chairman, with Wolfgang Burhenne, Germany, chairman for Europe.

By action of the General Assembly, Enrique Beltran of the Mexican Institute of Renewable Natural Resources was named to head a Caribbean Committee that would serve to promote interchange of information, cooperation and study with respect to Caribbean fauna. In this area a number of endangered species face extinction.

Dr. Roger Heim, noted French scientist, was reelected President of the Union. Vice-presidents are V. Van Straelen, Belgium; Lord Hurcomb, United Kingdom; Enrique Beltran, Mexico. New members elected to the Executive Council were Peter Scott, United Kingdom; Prince Tongi of Tonga; K. Curry-Lindahl, Sweden; Rocco Knobel, South Africa. Tracy Phillips was reelected to the post of Secretary-General, and Marguerite Caram as assistant Secretary-General. Headquarters of the Secretariat of the Union is at 31 rue Vautier, Brussels. The Sixth General Assembly will be held in Athens, Greece, in 1958.

Membership in the Union is confined to governments, international organizations and conservation organizations within a country. Member organizations now number 225. Individuals may support the work of the Union, receive its various publications, and take part as observers at the sessions of the General Assembly, which are held every two years, by joining Friends of I.U.C. Information about the Union, and Friends, is available from the Commission on Public Information, IUC, 1214 16th Street, N.W., Washington 6, D.C. ♣ ♣ ♣



The high school class of 1936 started the school forest as a memorial to its president, who had died early in the school year. Other classes added acreage and trees, and the Class of 1952 presented this memorial monument and plaque with another plaque on which to record the gifts of other school classes.

Ladysmith, Wisconsin, students made its school forest

A Lasting Memorial



Ladysmith high school students gather in the memorial forest.



A State forester talks to the students in the school forest.

TWENTY years ago the Class of 1936 at Ladysmith High School in northern Wisconsin, sought a class memorial more enduring than stage curtains, school furniture, sundials, or pictures. Many such memorials of other classes had already been discarded or destroyed, and others were damaged beyond repair. Furthermore, the Class of 1936 wanted to dedicate its memorial to the memory of the class president, who had died early in his senior year. The class wanted no fragile, transient, thing for its memorial; the goal was something lasting and indestructible.

After careful consideration of the problem, the memorial committee proposed to purchase forty acres of land four miles from the school on U.S. Highway 8. This land was to be planted "to a forest of evergreen, that it might be a living memorial" to the class president. The vote was unanimous, the land was purchased and several acres were planted to pines and spruces before commencement of that year. In his presentation of the memorial, the acting president urged that further plantings should be done by student groups to complete the forty-acre memorial planting of evergreens.

Probably no other high school memorial has ever so abundantly fulfilled the wishes of its donors. The evergreens were planted within a few years. An appropriate school forest sign was made and erected by the Agriculture and Industrial Arts classes. Those replanted acres have truly fulfilled every wish of the Class of 1936; indeed, this high school memorial forest surpassed the



Many birds and mammals have taken up residence in the memorial forest, which affords a wide variety of habitats. Here is a bittern "shot" by one of the student photographers.

By E. M. DAHLBERG

Photographs by John Hillert

most extravagant hopes of any member of the class.

The worthiness of the project was so appreciated by the youth of succeeding high school generations, that, by 1956, sixteen of the twenty classes had dedicated their memorials in the School Forest. Most of these were further gifts of land; others were appropriate monuments and markers of bronze and stone; but the gifts of land have expanded the forest area to seven hundred and sixty acres in 1956. More than a thousand graduates of the Ladysmith High School have contributed to this extraordinary class memorial.

This block of native landscape embraces a wide variety of habitat situations typical of this northern resource region. The site is bounded on the south by U.S. Highway 8 and on the north by a charming wilderness stream, the Thornapple River. Flowing through the area is Twin Creek, home of beavers, muskrats, minks and otters; happy hunting ground for blue herons and American bitterns and brief rest-haven for ducks on their autumnal migration.

Thus the forest is not alone a memorial to the thousand graduates who made it possible; it is an open textbook for the biology, conservation and Nature classes of the Ladysmith schools. Field trips and special programs bring many classes into the forest. On some occasions the entire high school enrollment has attended and participated in dedications, local historical pageants and in special research and educational activities.

The local conservation personnel assists in many ways to make conservation education a realistic part of the school forest program. Officials loaned the planting



Students study the relations of Nature in the Twin Creek habitat.



The Ladysmith "Lumberjacks" eat out in the forest, as did early lumberjacks.

tools with which the students planted more than a hundred thousand trees during the first decade of the project. Research men in fish and wildlife management have conducted whole-day field trips; forest protection men have demonstrated methods of fire fighting on controlled areas within the forest.

The Class of 1952 dedicated a beautiful monument at a presentation ceremony in the forest. This event was attended by the entire student body. A State Extension Forester addressed the students on the urgency of conservation education. The class president unveiled a monument bearing a large bronze plaque with the class numerals of all contributing classes, and with room for other numerals as succeeding classes may wish to dedicate their memorials in the School Forest.

Owing to the numerous wood industries in Ladysmith, and because of its origin as a lumbering community, the Ladysmith student body has assumed, for its athletic teams and other activities, the name "The Lumberjacks." And it is most appropriate that "The Lumberjacks" should have a School Forest, and, on many occasions, they have shown their deep enthusiasm for this possession. One memorable event was a "dinner out" on their "Lumberjack Day" in mid-winter. This occasion was in imitation of the manner in which the early lumberjacks took their noon meal in the woods. Guests this day were the wardens, rangers, foresters and wildlife biologists from the local conservation station. After the three hundred students and a score of guests and faculty were sufficiently sated by vast helpings of baked beans, sandwiches and coffee, there were speeches of a serious nature, including the reading of the 1936 memorial presentation. Also, there were some "tall tales" of the days of Paul Bunyan, that legendary lumberjack of forest fame.

In 1955 an important historical point was perpetuated in the school forest on the spot where a bearing tree had been scribed in the first government survey of the area. Research among the original field notes at the State Land



The first forest sign put up by the Class of 1936, which acquired the first acreage.



The Thornapple River forms the northern boundary of the present forest.

Office in Madison disclosed that this survey was made in the winter of 1853. The bearing tree stood nearly half a century after it was scribed by the surveyor; but it was cut in the pine-logging days of about 1900. However the survey mark found on the stump was easily deciphered as $\frac{1}{4}$ S, which, in survey language, means the south quarter line of the township then being surveyed. A facsimile of this scribe mark, cast in bronze, has been placed on a concrete base to perpetuate the position of that "witness Tree" scribed in 1853.

The School Forest, and several thousand acres to the northeast, are typical second-growth northern landscape. The highly diversified terrain of the area supports a great variety of native wildlife and vegetation. This creates an interesting and intricate ecological resource pattern. In the native bogs students can walk through acres of sheep laurel, lush with pink ladyslippers and pitcher plants, if they do not mind wet feet. Crowding the margins of the bog are balsams and tamaracks, and always there are snowshoe rabbits in numbers inversely proportional to the population of foxes. There are resident raccoons, porcupines, three species of squirrels, black bear (perhaps only one), and numerous lesser rodents and carnivores. All these mammals here find some sanctuary from

invasion by cars, cows and plows. However, the survival of the larger species of mammals is seriously threatened by hunters and trappers.

Any tract of native woodland protected from fire, timber trespass, and livestock, will eventually yield a forest crop. In the School Forest there is already a considerable quantity of mature timber ready to harvest. Minor salvage and improvement operations have already returned a net profit of more than \$600. In April and May of 1956 the first significant commercial cutting was done on a forty-acre area with the removal of the mature poplar for the paper industry. This was done in strict observance of the principles of selective cutting for sustained yield, and under the supervision of the School Forest Custodian. All forestry (continued on page 444)



*Persecuted, and with a
bounty on his head,
there is good reason
to say*

A Word for Old Porky

By BILL GEAGAN

AFTER twenty-five years of prying into the family affairs of Nature, and of fighting, with the printed and spoken word, for its preservation, I am tired of the word "predator."

Sportsmen everywhere have been bandying the word around for many years without knowing exactly what it means, or how it properly should be used. I have learned, also, that, to most of the gun and rod boys, anything that kills something they want to kill is a predator.

All of the hundreds of boys who attend my classes in Nature and conservation at the Maine Sportsmen's Junior Conservation Camp on Branch Lake in Ellsworth, Maine, are first told that all things great and small in the outdoors are important. This is carefully pointed out to them, with the aid of sketches, diagrams and charts on a large blackboard set up in the woods. They learn that all things are relative; that because of this relativeness they are all a part of Nature's wonderful arrangement, and that everything has an important task in order that a healthy balance may be maintained. These opening remarks are brought to a close with this reminder: "Proof of what I say is seen in the fact that all of those creations of Nature were here before we were!"

I am happy to report that my teachings have succeeded in starting many a young outdoorsman with a deeper appreciation of Nature and the outdoors. I regret, however, that the same teachings directed to adults by way of press, radio and television have not enjoyed equal success. This seems to prove the old adage, that you can not teach an old dog new tricks. However, there has been some progress as the years roll on; enough at

least to encourage me to continue preaching this sermon.

After many years of campaigning for the protection of those valuable birds, the hawks and owls, enough of the right kind of people finally banded together and pushed such a bill through the Maine Legislature at its 1955 session. But, unfortunately, there was deft political meddling, and protection for the great horned owl was omitted. This, like all such encouragement of the destruction of the wild things, was due to the same old prejudice born of ignorance.

It is my hope that one day I shall be instrumental in bringing about protection for other valuable species, and have worthless, long outmoded bounties lifted from the heads of the bear, bobcat, and porcupine in Maine. My strong belief is that bounties, in addition to being outrageously expensive, accomplish nothing; that bear and bobcat should be protected. This view is shared by the State's wildlife biologists.

While the bobcat does take some deer, most of such victims are sick or wounded animals that would die anyhow. The bear who, in certain areas and from time to time, damages the property of man, does much more good than harm—much more good than is generally known.

Although I can see no immediate hope for protection of the lowly porcupine, I do believe that the present incentive to seek them out and slaughter them will come to an end as a result of removal of the bounty. A bounty law was passed by the 1955 Legislature and went into effect August 20, 1955. Town and city clerks were authorized to pay fifty cents for the four feet of each animal killed, the money to come from the State's dog tax fund.

The slaughter got under way immediately, and, in less than two months, the clerks were literally buried with porcupine feet and were paying out thousands of dollars to the commercial hunters. Bounty payments soared swiftly to some \$20,000 and the fund was soon exhausted. A double-barrelled problem arose; what to do with the feet and where to find more money to pay for more feet. The bewildered clerks disposed of the feet as best they could, and there is nothing to prove that many a set of porcupine paws was not recovered and presented at least a second time. Then, in order to continue with the wasteful nonsense, it was necessary to call on the Governor for a substantial appropriation. And the war on porcupines continues. It is my belief at this time, however, that this silly law will soon be scratched from the books.

Like many others who spend much time in the woods I have observed the damage to trees and man-made property by porcupines. They have chewed my canoe paddles and axe handles in quest of salt deposited by perspiring hands. And if dishwater being thrown out a camp door had splashed on the threshold, they would chew there, too. Such damage is sometimes costly, causes considerable inconvenience, and, at the time, makes you pretty mad. But, in all fairness to the porcupine, if those paddles and axes had been placed out of reach of the animals, and if care had been taken in disposing of the dishwater, such damage would not have occurred. It must be remembered that the forest is the home of the porcupine and man is but a wayfarer there.

The sportsman screams to the high heavens when his dog gets his nose full of the porcupine's quills, but poor old Porky would not have left those painful souvenirs if the dog had not attacked him. Those sharp little darts with the tiny barbs are the porcupine's only protection.

In quest of food the porcupine often girdles the bark on the trunks of young trees. Eventually those trees wither and die. Then there is more screaming. This time from the lumberman or pulpwood cutter who wanted to do the same thing with his axe and saw.

But in killing such trees the porcupine is not alone satisfying his hunger. He is also making it possible for other trees close by to grow much faster as the result of obtaining more nourishment from the earth, and more light and sunshine to promote growth. Thinning out of the trees by the porcupine is sound forest management. And after long observation and study across the years it is my belief that that is one of the porcupine's major assignments from Nature.

Another equally important and little known task carried out by the porcupine is feeding other animals. Only those observant persons

who travel through the woods, when the winds are biting and the snow is heaped high, know of this strange work. Old Porky does not go wandering through the snow-choked woods bearing gifts of various foods to the homes of creatures in need. But he does feed those herbivorous animals that do not climb. Here in the Northeast the beneficiaries are deer, hare and rabbit.

Forced into the frozen swamps where white cedar is abundant, the deer, in groups of various sizes, beat down a web of little trails in the deep snow as they move about and feed on the green browse. Such winter havens are commonly called yards. But many times such areas become over-browsed and deer may die of starvation. In those over-browsed areas the foliage is cleaned off the cedars as far up the trees as the largest deer can reach by standing on its hind legs. The smaller deer suffer most, therefore.

With the cedar supply exhausted the hungry animals turn to a survival diet of hemlock, fir and pine, also twigs, bark, lichens, and even sticks. Death from starvation is prevented in some of these yards by porcupines, who set up housekeeping in the area and, feasting high in the conifers, cut and drop large amounts of

In the forest Porky helps to thin out trees, in winter he harvests upper branches that help deer keep alive, and otherwise he plays his part in Nature's program.



browse to the hungry deer that may be yarding below.

Mentioning this phenomenon recently to my friend Russell DeGarmo, Chief of Maine's Wildlife Survey and Management Division, he said he has known of numerous instances when the food provided by porcupines was all that the yarded deer had throughout the greater part of the winter.

This dropping of browse is not confined to the deer yards, but is widespread in the woods where conifers stand. I have seen bits of fir, spruce, hemlock, pine and

cedar so thickly scattered over the top or the forest snow blanket it seemed as though a crew of men with knives had gone through.

During periods of thaw when the red squirrels leave their tree dens, they, too, dash through the evergreens and drop bits of browse down to the snow, apparently helping old Porky in his role.

And so it goes in the wonderful world of Nature. Every creature large and small has a job to do—even the poor old persecuted porcupine. ♡ ♡ ♡

Look Out for "Greenlegs"

By GEORGE H. BREIDING

Photograph by the Author.

WHEN you are looking for shorebirds in the late summer or early fall, look twice when you see what you think is a lesser yellowlegs. The second look may prove that it is "greenlegs," or the stilt sandpiper, which is not always easy to identify in its winter or immature plumage.

In general the stilt sandpiper is a slightly smaller species than the lesser yellowlegs. The shape of their bills are somewhat similar. The average length of the yellowleg's bill is longer, but the stilt's may give the appearance of being longer when compared to the size of its head. In other words the comparison is in the length of bill and head-size. Where the yellowleg's bill may be considered a "little" longer than its head, the stilt's bill is said to be "much" longer than the head.

Trying to ascertain this difference in the field can lead to a problem of identification. However, the lack of barring in the tail feathers, along with the greenish legs, will help to pin down the stilted one. Also, it may bear a slightly heavier eyeline than the yellowlegs.

Other species add to the confusion. One is most likely to be seen "strutting and spinning" on the surface of the water like a little spring-wound toy. It is the Wilson's phalarope. If it happens to be seen on shore, the relative whiteness of the bird, the "shiner" or black eye, and pointy bill put it in its place. It also has greenish legs, but they are much darker and shorter



Yellowlegs? Take a second look. It may be—and in this case is—"greenlegs," or the stilt sandpiper. This sandpiper is considered more or less uncommon by some authorities. Perhaps, through difficulty in recognition, it is overlooked, or mistaken for a similar-looking species.

than the stilt sandpiper's. It is *Microgalina himantopus*.

The other species to think about is the dowitcher, but its longer and heavier bill and larger size should help you to eliminate it.

Identifying sandpipers and other shorebirds in the fall can be a real challenge to bird watchers. Sometimes the greater the difficulty they present, the more absorbing, the more frustrating yet satisfying, and the more enjoyable the game of bird watching becomes. And with difficult groups of birds, it always pays to take the second look. It may make the difference between adding a new bird to one's life list, or "turning up" an unusual or uncommon species for a given locality.



Coo perches on the author's head, a favorite roosting spot of the dove.

THEY had neither home nor family. A woman's hand fished them from a puddle on her lawn during a rainstorm.

"I don't want them," I told her, when she brought them to me, helpless, ugly little balls of pin-feathers.

"Nobody wants them," she said. "I guess they will die."

So I took them, fully aware that baby doves feed from their parents' craws, on a fluid called pigeon milk. Could I concoct this milk, for which there existed no known recipe? I experimented, and came up with an

The Love of A Dove

overcooked oatmeal gruel, which I had to force down their throats with a medicine dropper.

For several weeks I fed them this sticky concoction and they grew and feathered out. Sometimes I fed them outdoors. At one of these times the larger dove refused the gruel, clamping her beak tightly shut. I tried force. She stiffened herself and tried to back out of my hand, then lunged forward, taking off into the blue and leaving me a handful of her tail feathers. She soared to one of the elm trees, alighted on a high branch, near enough but much too high in the tree for me to reach her. I called and enticed, but she turned a deaf ear. "All right," I said, "I'll feed your brother."

About an hour later, I saw her float from her perch past my window. Out I ran. She watched, quivering her wings and peeping. Glad to have her back, I tucked her in my hand, and gave her a soft cuddle against my cheek. That day I dubbed her Bobette.

When I put her in the cage, she began picking up chicken mash, which I had sprinkled on the floor of the cage. With each successful bite she seemed to say, "See, I'm a big dove now. I don't need to be fed." (I took her for a female, since the females of most species develop faster than the males).

Three days later the smaller dove, which I named Coo, followed suit. "So, you are dismissing me, too!" I rejoiced when I saw him join Bobette and feed himself dry mash from the floor of the cage.

No longer worried that they would starve, I decided to free them. However, before I gave them freedom, I asked Mr. C. F. Marshall, licensed bird bander, to band them.

The first morning I put them out, I felt as I did the



The first night after the dove's return from a winter in the Southland, the bird selected a lampshade as a roosting spot and seemed delighted and contented to be home again.

By BEULAH WOODS ALLEN

Photographs by Ralph Lester

first time I left my toddler son in the backyard unattended. I kept one eye peeping out the kitchen window, for I felt uncertain, overanxious, and a little sad. And they seemed every bit as concerned as I. Their little gray heads turned hopefully toward the window, their round, brown, bead-like eyes searching for mine. The sudden push of the wind through the trees, the throaty churr of the red-bellied woodpecker, and the loud, friendly chatter of chickadees bothered them. Like fearful children they came, time and again, to the back door, craning their necks, peering through the screen door for a reassuring look.

That night I stood in the open door, and called, "Coo, coo." They took off simultaneously from the terrace tree, where they were double-parked, and landed on my head. Indulgently, I let them ride thus to their bird cage roost.

Sometimes they waited for me on the doorstep. When they did, I opened the door, and they walked in. They came up, night after night, to be put to bed, and I simply could not bring myself to shut them out into the night.



When someone telephoned, Coo seemed to prefer to "hitch-listen" on one's shoulder.

As they became braver and sailed away, out of sight, I wondered if I would see them again.

One day I watched them hop off the terrace and join a flock of white-throated sparrows jumping for ripened heads of fox-tail grass. Each time the sparrows jumped, they fluttered their wings. Bobette, time after time,



Coo and Bobette spread their wings in a patch of sunlight. This photograph was taken before Bobette came to an untimely and undetermined end, leaving her brother to be the center of attention.

imitated the jump and the wing flutter, yet I saw her make no attempt to eat the grass seed.

That night, after hobnobbing with the white-throated sparrows, Bobette refused to come in. I let Coo in, and then returned for Bobette. I persuaded and persuaded. I waited and waited. At last, chilly, and a bit impatient with her dilly-dallying, I shook the limb where she perched; a whistling of wings and she was gone.

Early the next morning I hurried out to track her down. Beside the brush pile, where the white-throats roosted, I found a sad memento, her soft feathers scattered like gray confetti.

With his sister gone, and other doves long since migrated, Coo moved indoors for the winter.

He tolerated his cage willingly only as a bed and as a diner. By making like a harp with his beak on the wires of his cage, he soon let me know he favored the open door policy. And because, in my quiet study, this harp-playing proved as irritating as a leaky faucet, I tried banishing him to another room. The minute I closed the door, he began crying, "Co-ooh, coo, coo, coo," over and over again, as if his heart would break. It had the intended effect, and right away brought me to his terms.

Like a spoiled child, he went all out for attention. He learned that I disapproved having him perch on my books. So this became his favorite game. He tossed off my scoldings with an impish flirt of his eye and an impudent coo. Only the swish of my hand sent him flying. The instant I turned my back, I heard his whistling wings and knew he had once more made a perfect landing on my bright red dictionary. I clapped my hands, and put plenty of pepper in my voice. His answering coos were snickers. He repeated this six to ten times, showing himself to be truly a "game" bird.

Another game he liked to play, we called the Flying Game. He flew to the head of the stairs and sat there. Looking back at me he fluttered his wings, inviting me to chase him. As I joined him, his streamlined body zoomed down the stairs ahead of me, and landed on the living room floor. The Flying Game thenceforth changed to hide-and-seek. For, by the time I reached the ground floor, he had done a disappearing act. Try as I would, I could not spot him. He had vanished, his colors blending perfectly with the rug. I called, "Coo, where are you?"

He answered "Coo" each time I called. Only the sound of his voice disclosed his presence. He loved the return trip to the upstairs study, for he took the high road, whooshing up like a homing pigeon; while I took the low, huffing and puffing up the hard way.

When we had company, he was in the limelight. He

startled our guests by flying to their heads. When their hands tried to capture him, he rocketed away, for he resented being held. Then he retired to the rug, where he listened, watched, and added his expressive coos to the conversation. When the guests rose to leave, he walked importantly to the door with us to bid them good-bye.

The ring of the telephone startled him, yet, either he wanted to be in on these endless pow-wows, or he disliked playing second fiddle to a bell, for as we talked he stood watching us, tilting his head as though listening. When he could stand it no longer, he flew to a shoulder and hitch-listened.

On winter nights when we sat by the wood fire in the living room, the dove dozed like a cat on the rug in front of the fire. Sometimes he left this favorite spot to sit in the chair beside one of us, or, often, perched on the toe of a shoe.

Occasionally, I forgot his bedtime. When I remembered, he was already asleep in a bed of his own choosing. He answered me sleepily, when I called, with a coo that sounded more like a slurred, "Hu-uuh?" When I lifted him, he kicked furiously with his little red feet, his heartbeat quickened, and with taut, heaving muscles he tried to free himself from my grip. He reminded me of an irritated child, awakened from sleep and carried against his wishes to bed.

With the coming of spring, I again freed Coo. He came up in the eve-

ning to sleep in the house. In late summer, though, we discouraged "sleeping in."

He came daily to the glass ash tray, which we kept on the terrace filled with small seeds. Then in September he disappeared. We hoped he had migrated. However, the odds of a pet dove in the wilds surviving "dove season" seemed indeed slim.

Friday, April the thirteenth, when I looked out an upstairs window, and saw a dove preening himself in the terrace tree, I wondered. I watched him. His mannerisms were Coo's, I felt certain.

"It's Coo," I thought. "I know it's Coo." I opened the window with a loud swish. "Coo," I called, "where have you been?"

I had half expected his swift wings would take him over the roof and away, but they brought him—plop—against the screen of my window.

It could have been an excited dove, I told myself as I hurried down the stairs and to the back door. However, as soon as I had opened the screen and called "Coo," he was on my head.

It was a great homecoming for both of us. As I excitedly telephoned the good news to my husband, friends and neighbors, Coo sat perched on my head.

All day long he stayed right with me. When the neighbors and friends came in (continued on page 444)

MATINS

*The towhee scraped a rusty coin
Against the cup of morning.
A ragged starling paused to spare
A thin and flippant farthing.*

*The shillings of the titmouse rang
With a solid silver sound
Until the finch spilled all his purse
And brimmed the morning round.*

*The robin's tuppence tipped the brim,
Coin jingled through the air,
And day collected offering
Of song from everywhere.*

Cleo Sibley Gross

The "Wildcat" Tree

By JOHN D. KENDIG

Photographs by the Author

THERE is no trail that leads to the deformed old swamp white oak, the "wildcat tree." Your only starting guides are a low table rock, where you leave the road, and a small stream that trickles down into the cedar flat. You are soon lost in a thick growth of young hardwoods—red maple, American elm, white ash, swamp white oaks and thorn trees. Red cedars are everywhere, from three-inch seedlings, peeping up through the coarse grass to tall spires some thirty feet high.

Honeysuckle mats cover many of the low, basaltic



From a distance the wildcat formation of the old swamp white oak is most striking. (Left) Closer view of this unique tree. The circumference of the tree at its base is thirteen and one-half feet, and the two limbs that have turned into trunks reach up sixty feet and have a circumference of seven feet each.



rocks, and those in the open are well-decorated with bright green lichens and tiny mosses. Card teasle heads stick up here and there, and bittersweet and greenbrier vines climb up into the trees. Over all there is a deep silence.

Across swampy ground you follow the stream as it leads deeper into the heart of this isolated little world between two highland ridges. You must keep watch on the left for an opening in the woods that reveals this veteran monarch of the area. It is a swamp white oak, the most unusual tree I have seen in thirty years of wood's work and rambling. Really, it is two trees on one end, and a "wildcat" on the other.

Many years ago some strong force, perhaps a falling tree, bent and broke this oak to the ground. But it persisted and now thirteen feet of it extend out horizontally, being only eight inches above the ground at the far end.

There two otherwise normal branches apparently turned up into trunks, which rise together for a height of sixty feet. Each trunk is seven feet in circumference while that at the base of the tree is thirteen and a half feet.

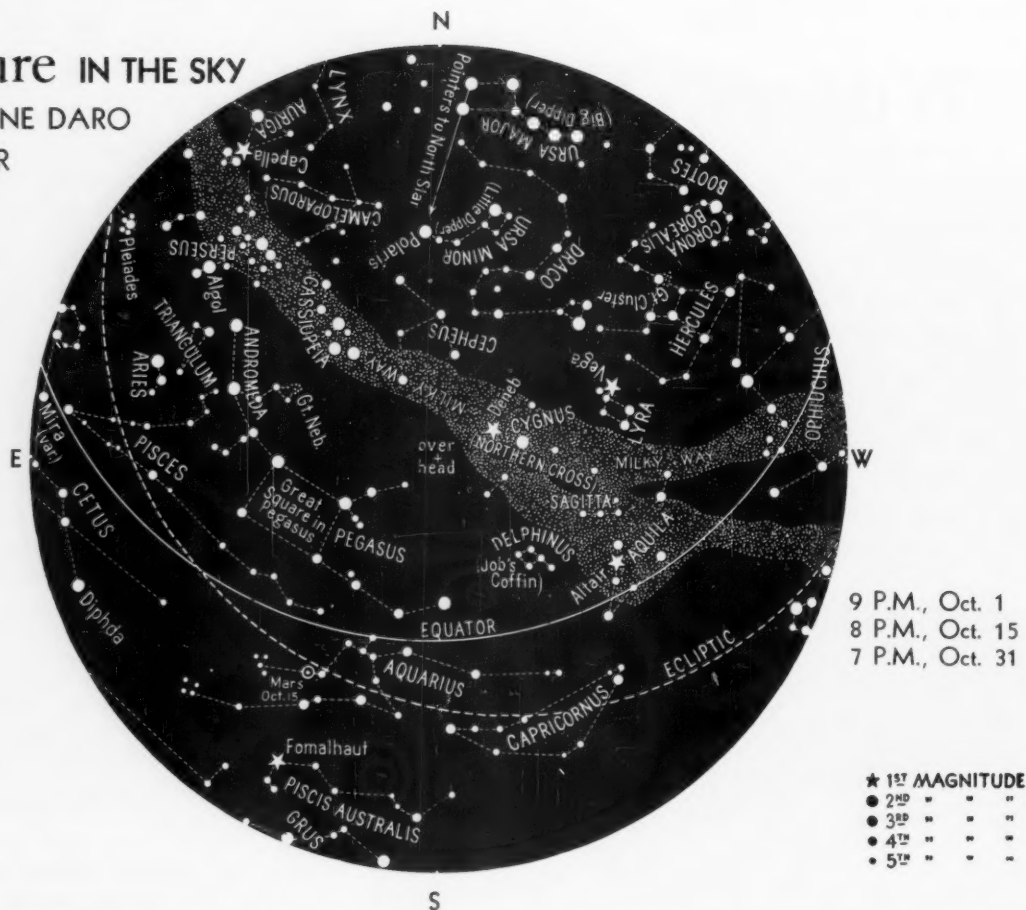
About four feet up from the base of the tree, where it had been broken and bent over, there has been formed, in the process of healing, a nearly perfect wildcat head, with the supplementary outlines of the front legs, paws and back. The animal resemblance is so good that you almost expect to hear the cat howl weirdly and stalk off into the deeper wilderness. Letting your imagination rove, you can think of this wildcat in a tree as a monument to the last big cat that roamed these northern Lancaster County hills of Pennsylvania years ago. And the more you look at it and the oftener you return, it seems to grow more lifelike all the time, as one man has especially noticed since he first saw it more than twenty-five years ago.

Near the oak is a prostrate, six-inch-circumference red cedar in an early stage of developing into a somewhat similar odd tree. Who knows what wild beast it will commemorate in the future, and right now it suggests how the oak tree came into its present shape? It and the old "wildcat tree" will certainly bear watching, and both deserve preservation.



Nature IN THE SKY

By SIMONE DARO
GOSSNER



To use this map hold it before you in a vertical position and turn it until the direction of the compass that you wish to face is at the bottom. Then, below the center of the

map, which is the point overhead, will be seen the constellations visible in that part of the heavens. Times given are for Local Standard Time.

Minor Planets (I)

UNTIL the discovery of Uranus in 1781, there were only six known planets in the solar system—Mercury, Venus, the Earth, Mars, Jupiter, and Saturn. It had been known since the days of Kepler that a rough value of the distance of each planet from the sun could be obtained empirically as follows: Write the series 0, 3, 6, 12, 24, etc. . . , doubling the number each time. Add 4 to each number and divide by 10. The result reads 0.4, 0.7, 1.0, 1.6, 2.8, 5.2, 10.0, 19.6, etc. . .

The observed distances of the planets, in units of the Earth's distance to the Sun, are remarkably close to these figures: Mercury (0.39), Venus (0.72), Earth (1.00), Mars (1.52), Jupiter (5.20), Saturn (9.54). There was one notable exception; no planet was known at the distance 2.8. This rule is only empirical, and has never been explained scientifically. In spite of this, J. E. Bode, who later became director of the Berlin Observa-

tory, expressed his firm belief, in 1772, that there must be other planets in the solar system, and particularly that there should be one at distance 2.8.

Herschel's discovery of Uranus in 1781 confirmed this belief. The distance of the new planet was found to be 19.2, still reasonably close to the value 19.6 given by the empirical law. A group of astronomers decided to undertake a systematic search for the "unknown planet" at distance 2.8. But, before they had time to organize themselves, Giuseppe Piazzi, at Florence, accidentally discovered, on January 1, 1801, a faint object that did not have the appearance of a comet and showed a motion similar to that of a planet. Bode was overwhelmed by this discovery. From the apparent motion of the object he deduced that it must be a planet located precisely at a distance of 2.8 astronomical units from the Sun. They called it Ceres, the Roman goddess of growing vegetation.

History, however, had a surprise in store for Bode. Less than a year later, a second planet was discovered, also approximately at the same distance from the Sun. Another goddess of mythology, Pallas, lent it her name. Then came Juno, in 1804, and Vesta, in 1807. There was a temporary lull; for a while it seemed as if no other would be found. But a fifth one came in 1845, then a sixth, and a seventh. By 1891, no less than 322 faint planets had been discovered visually in the solar system, and astronomers had run out of mythological names.

Then photography took over. The number of known minor planets—or asteroids—increased at a staggering rate. There are now close to two thousand cataloged asteroids. This number does not take into account isolated observations of planets that were subsequently lost for lack of accurate information concerning their orbits.

Asteroids are too faint to be observed all year around. They can be followed only when they are in that part of their orbit directly opposite from the Sun as viewed from the Earth. In order to rate a definitive listing in the catalog, a newly discovered planet must have been observed for a certain length of time, its orbit must have been computed, and it must have been observed at least at one of its returns.

It is estimated that there must be at least 50,000 such objects. Obviously, an isolated observation is of no value, unless the planet can be properly identified. At the present time, the Cincinnati Observatory, under the directorship of Prof. Paul Herget, has the responsibility of gathering all minor planet observations, and of carrying out all the necessary computations. This represents an enormous task. Hand computations, even with electric desk computers, are entirely out of the question. Such an undertaking is possible only because of the advent of high-speed electronic equipment.

Photographic search and routine observations of asteroids have been highly systematized. Our illustration is an example of one of the techniques currently in use. This is a routine observation of Cybele (asteroid number 65), obtained last March at the U. S. Naval Observatory. The photographic film is exposed for a short

time on the asteroid and surrounding star-field. The exposure is then interrupted for thirty minutes to allow the asteroid to move with respect to the surrounding stars. A second exposure of equal length is then taken on the same field after the telescope has been moved slightly in declination to separate the two exposures. This double exposure provides two images for each star and for the asteroid. The displacement of the star images is caused entirely by the observer's shifting of the telescope and is thus identical for all of them. But

the asteroid has a motion of its own and its double image (see arrow) will be oriented differently than the star images. A casual inspection of the photograph reveals immediately the location of the asteroid. This particular method of observation is used for the specific purpose of measuring planetary positions. Such observations are used in the computation of improved orbits.

There are several other methods of observation, but all are based on the same principle that the apparent motion of the planet is different from that of the surrounding star field.

An analysis of the orbits of known minor planets reveals that the majority of them lie within the gap between Mars and Jupiter, forming what is commonly called the "asteroid belt." This proximity to Jupiter, the most massive planet in the solar system, causes severe perturbations in the motions of the asteroids and has provided the science of

celestial mechanics with some of its more challenging problems.

The most intriguing cases are those asteroids the orbits of which exhibit abnormalities of one kind or another. Some orbits, for example, are highly inclined with respect to the orbit of the Earth. Others are found to be highly elongated, like the orbit of a comet. Some asteroids even move in a retrograde motion.

All these exceptions and special cases are of the greatest interest to astronomers. Obviously, any theory concerning the origin of minor planets must account for the exceptions as well as for the "normal cases." There is already such a wealth of observational material that present efforts tend to be concen-

(continued on page 444)



OFFICIAL U. S. NAVY PHOTOGRAPH

Cybele, Asteroid #65, photographed on March 10, 1956, with 15-inch Cooke Triplet of the U. S. Naval Observatory.

Nature IN THE SCHOOL

By E. LAURENCE PALMER

Professor Emeritus of Nature and Science Education, Cornell University,
and Director of Nature Education, The American Nature Association

Questions of Reality

WHAT IS A MAPLE? Is it just a woody plant that is a member of the Aceraceae? If it is a sugar maple, is it a tree the diffuse-porous wood of which, at 15 percent moisture content, weighs 44.5 pounds per cubic foot, and whose sap in spring is of such sugar content that 40 gallons will boil down to 1 gallon of standard maple syrup or to 8 pounds of maple sugar? Is it just something with opposite leaves that may bear winged fruits of which 7000 will weigh a pound and have a normally expected germination of 30 to 50%?

On the other hand is a sugar maple just something that will produce superior firewood and a splendid blaze that will cheer, comfort and warm me, or will develop coals to cook my food perfectly around a campfire? Again, is it something that "may in summer bear a nest of robins in her hair," or a family of gray squirrels within its heart, or a host of forest caterpillars on its limbs? Is it a reasonably substantial marker of real estate boundaries, since it may live 300 years and outlast any human being but not the human race?

Certainly this maple is not a clinging vine but a reasonably substantial emblem that reflects credit on the doctrine of individual initiative. Certainly in the fall it may become superlatively beautiful because of its brilliant yellow or red foliage, the color depending on physical, physiologic and, possibly, genetic factors. In its autumn glory this tree is not just a thing by itself. It is a part of a considerable part of this United States, something that may make desperately homesick many of those who have been privileged to know it at its best and who have been deprived of it for one reason or another.

Which is reality?

Which is the reality of a sugar

maple, the wood, sap, shade, beauty, shelter for wildlife, part of a whole landscape, or does it achieve reality because it is part of the soul of someone who has learned to love it through sustained happy experiences? To me, maples that I used to climb as a youngster, but which have long since vanished to make way for city improvements, are as real as some of the trees in my own backyard today. Those maples of my boyhood are much more real than the trees that I know may well develop from seedlings in my woodland across the street from my home.

Gestalt psychology tells us that to understand things we must think of them not only as entities but as parts of a whole; that the reality of an organism includes not only the organism itself but the impact it has on its environment and the effect of its environment on it.

This means that a bullfrog is not just a pickled specimen on a laboratory table. It is something that may destroy little frogs in its own frogpond, may disappear into the crop of a hungry heron, provide the supper of a hungry raccoon, or food for a hungry bass. And the bullfrog is a part of a warm summer night, when it may be more easily heard than seen, and it means many more things, of course. According to this philosophy we cannot expect this frog to react normally in any other environment than that in which it would ordinarily live. To me the only real picture of the frog is the one that is the most complete and the most natural. There is no such animal as the frog. There are only frogs of different species, of different ages, in different areas, reacting to different situations. All of these put together give me what I think is a concept of the real frog.

I like to think of as reality the next insert I am writing for *Nature Magazine*. And I somehow feel that a series of books, on which I am now working, is, to me at least,

something that has substance, has reality. Surely to an architect the building for which he is drawing the plans is a reality when he has finished his part of the work. Implementing it into something with elevators, air conditioners, garbage disposal systems and glass windows is another kind of reality.

Material and imaginative

Of course, all these concepts of which I have written have elements that are material. My maple, which went into the firebox after it supported my swing when I was a kid, is as real as one of the maples outside my window today. A few years ago I planted a row of maple saplings along the road that led to a friend's "hideout" in the hills. I could see in my mind's eye just how they should look some years later. Now, sixteen years later, the place is owned by another friend and the trees have grown to assume much the appearance that I had in mind when I planted them. When I saw them a decade after having planted them I was surprised to see that they were merely beginning to measure up to the realities I had pictured when I planted them.

All of these realities are made up of aggregations of little experiences with many material things, or of little experiences of a subjective nature. Freedom, Christmas, honesty, justice, predation, success and fishing are just as much a part of my concept of reality as are horses, airplanes and forest fires. I measure alternative opportunities that will open up in my future much in terms of my experiences in the past. Since, in the decade that preceded the presidency of Franklin Roosevelt, I was able, as a school teacher, to build and pay for two homes, to stand heavy hospital expenses, to travel extensively, and to accumulate some savings, I am naturally inclined to favor the political philosophy that made that progress on my part possible. I know that there has been no subsequent decade in which I could duplicate one-half of that record.

Political philosophy

When I attempt to evaluate the offerings of any political philosophy I try to use many things as criteria. Has the following of that philosophy been generally accompanied by war or by peace? Have fewer or more peoples of the earth been brought

under control of governments dominated by force? Has the national debt been lowered or raised? Is the pledged word held in greater or less respect by individuals, states, nations and international bodies? Has peace and prosperity been real or false? Can a laboring man have more or less to show for his efforts at the end of a year? Can a professional man get an even break such as I got when I was starting out? Can those who through the years have by thrift, industry and integrity accumulated sufficient resources to see them through an independent old age any assurance that they can have the independence they have earned? These are some of the things I ask myself at these times, and I have little trouble in answering.

To me China is not just a spot on a map, or some gowns in my wife's closet, or some crockery on the mantel shelf. It is a phenomenon that for many years of my life was definitely improving. I gathered this from my experiences with Chinese students who studied in classrooms with me, from Chinese students who were my students, from Chinese men, women and children whom I met and with whom I worked in many parts of the world. To me the real China was and is a system of living dominated by a philosophy that produced persons whom I know, love and respect, but who have recently lost great pride in their fatherland.

The real China

To me the real China is not now able to find worthy expression because of influences I have no reason whatever for respecting. If I am to be realistic about China I must hold responsible those who lost to American friendship so many potential allies and friends. To me China is more than

"A Chinese junk with purple sail
Drifting beneath a sunset cold
and pale."

It is something that won and held the pride of men and women whose judgment I respect and whom I know well. To me parts of China include a Honolulu school teacher and her family, a boy servant in Jamaica, a gentleman in New Zealand, a merchant in Cuba, and a gardener in Florida, as well as many many students and friends in my own home town. To be realistic about maple trees, bullfrogs, political par-

ties and China I must consider all aspects of the situation available to me, not a few limited by space, time or opportunism.

Somehow I have a faith, nurtured, no doubt, by my early religious training but definitely confirmed by subsequent life experiences, that the most realistic, the most lasting future for anything is not based on force, intrigue, distortion, deceit, misrepresentation or the philosophy of the Big Lie enunciated by Hitler and Mussolini and supported by some of their American contemporaries. It is not something whose corner stone is betrayal but which resents inquiry in any form.

I must be realistic and recognize that there are plenty who do not agree with me. They are entitled to their views, which my experience suggests may not be valid. But as for me the most real things in human experience are mathematics, ethics, integrity and the Golden Rule. How is it with you? I am willing to act on the convictions my faith gives me. I hope that you have the courage and strength to do the same.

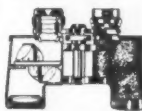
In Danger

From Guy Atherton comes a copy of Bulletin No. 2 that is being distributed by Conservation Militant. The bulletin presents facts bearing on the need for reducing hunting of badly harassed species, particularly the mourning dove. It lists extinct species of North American birds, the 22 threatened species and other important data. This bulletin is specially useful to teachers and students. Individuals interested may provide for the distribution of the bulletin to high school classes at a nominal cost. A copy will be mailed for a three-cent stamp if request is made to CvM, Box 72, St. Paul 2, Minnesota.

Potential Litterbugs

Keep America Beautiful, Inc., which is fighting the good fight to squash the litterbug, has compiled some statistics on the litterbug potential. There are 72 million licensed automobile drivers in the United States, and 61 million registered motor vehicles. They travel some 560 billion miles a year. If all those drivers traveling all those miles were litterbugs it makes one shiver to think what our country would look like. Unfortunately the percentage is still too high.

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THE Nature CAMERA

By EDNA HOFFMAN EVANS

Color, Then and Now

BY THIS TIME, I imagine, all the old-style, processing-prepaid type of color film has long since disappeared from camera shop shelves, and color enthusiasts like myself are fuming with annoyance because of the length of time it now takes to get color film processed.

Perhaps I am old-fashioned; perhaps I tend to cling to the old ways of doing things; perhaps I am just resistant to change. At any rate, I liked the old way of mailing color film direct to the nearest processing center and getting it back in my own mail box. Now I must make a special trip to take my completed rolls to a local dealer, and another trip to pick up my completed transparencies.

In the old days I could send a roll of film out on Monday and, with luck, could expect the postman to return the processed box to me on Friday or Saturday. Now anywhere from ten days to two weeks (occasionally more) must pass before I receive my summons to "come and get it."

Also, in the old days, the original price included the processing. Now the film price looks smaller—but added to it must be the processing cost, which must be paid in advance at many camera shops. ('S matter, don't they trust us color fans?)

This, of course, is a familiar tale of woe to all color photographers who prefer Kodachrome film to other types. Users of Kodacolor, Ektachrome, and Anscochrome get faster results, as a rule. But some of us stubbornly cling to Kodachrome as giving the truest color rendition—a matter of personal opinion, of course, but none the less we cling to it.

I understand that some camera clubs are going to urge a return to the old way of paying for processing with the original purchase. However, since the change is the result of a Supreme Court antitrust decision, such a return may not be possible.

There is a slight shortcut that

other photographers besides myself have discovered. This is the Fascolor Service, Inc., P. O. Box 86, Rochester 1, New York. First of all, the company offers Kodachrome at a price that includes processing by Kodak's specialists. Furthermore, there is a ten percent discount on film orders of three or more rolls at a time. There is an additional reduction in price if the processing is done by Fascolor rather than by Eastman.

To be specific, three rolls of 36-exposure Kodachrome film at ten percent discount with processing by Eastman will cost \$13.77. The same order, with Fascolor processing, costs \$13.05. I have tried both processing services and have noted no difference in their quality. As for the time involved, it takes from ten days to two weeks, about the same as the time required for processing through a local dealer. Fascolor provides convenient mailing envelopes and pays return postage. It also supplies other types of color film. Write for a complete price list. It is the nearest thing to the "good old days" that I have been able to find.



The Ektachrome processing kit for do-it-yourself color fans eliminates some of the delays and irritations of the present method of getting color film processed.

Do-it-yourself color fans can avoid the above delays and irritations. The Eastman Company sells a Kodak Ektachrome processing outfit, 35mm, which contains all the equipment and supplies needed for home processing of Ektachrome film. No dark-

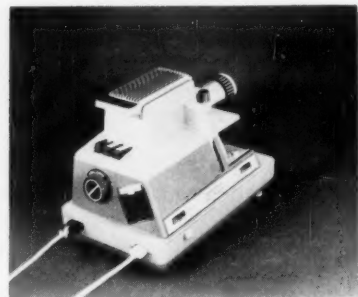
room is required, and the kit sells for \$24.75.

Included in the Kodak outfit are the following: A day-load tank with transparent reel for more convenient re-exposure; stirring paddle; color thermometer; Ektachrome processing kit; process E-2, one-pint size; 16-ounce darkroom graduate; six different-colored polyethylene storage containers of 16-ounce capacity with spill-proof covers and capping spouts; 100 ready-mounts with diagonal blue border; two trimming guides; four yellow Kodaslide boxes, and an instruction manual. Replacement chemicals are available for \$1.80 per set.



This new slide file box, designed to hold 16 yellow plastic containers, is styled like a book.

There are many slide file boxes on the market, but the new type of packaging in the yellow plastic boxes has brought forth another design. This is the Kodaslide 400 Filebox, (cost \$5.75) which holds 16 of the plastic boxes, as many as 400 cardboard or 176 glass slides, and is styled like a book for easy storage.

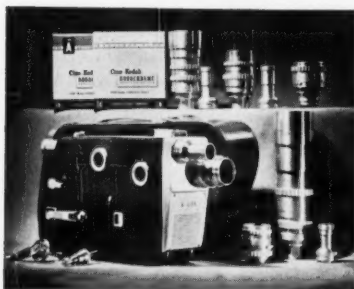


The Robomatic slide projector is ideal for the lazy projectionist.

For the lazy slide viewer, a new fully automatic slide projector called the TDC Robomatic has been developed by the Bell & Howell Company. The projector will show a series of 30 slides while the operator is comfortably seated at a distance.

By pre-arrangement, the slides will be on the screen from five to 90 seconds. The projector can also be operated by remote control, or the slides may be projected manually.

The Robomatic, priced at \$139.50, can be obtained from regular dealers. Further information can be obtained from Bell & Howell, 7100 McCormick Road, Chicago 45, Illinois.



Eastman's new 16mm roll-film camera, the Cine-Kodak K-100, is shown here with the full range of lenses for which it is adapted.

Eastman has announced a new 16mm roll-film camera, the Cine-Kodak K-100. It features a pre-stressed spring-power motor that exposes up to 40 feet of film at a single winding, a shutter release at the rear of the camera, a full size one-for-one telescopic viewfinder, and a speed-control governor. Available either with the Ektar 25mm f/1.9 or the Ektar 25mm f/1.4 lens, the K-100 will use any of a full complement of auxiliary Kodak Cine Ektar lenses in focal lengths from the 15mm (wide-angle) to the 152mm (6-times magnifying telephoto). Prices, depending on lens, are \$269 and \$369. A descriptive pamphlet (No. C3-101) is available on request from Eastman Kodak Company, department 8-V, Rochester 4, N.Y.

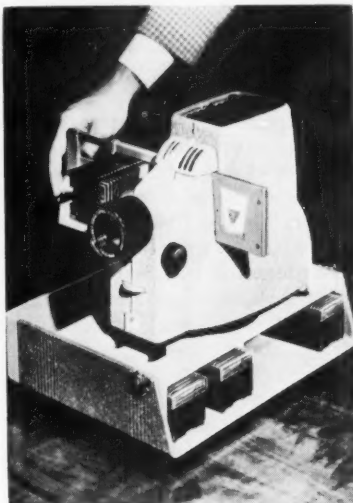
For readers interested in making translucent photographs—used for photographic lamp shades (see December '54 *Camera Trails*) for TV lamps, and illuminated displays, should write Eastman for the new, free, four-page folder about "Translucent Photographs."

New Projectors

Since projectors are almost as important as cameras to photographers who use color film, we make note here of several new or improved models announced by the manufacturers.

The Bell & Howell Company has

on the market now, through their regular dealers, two TDC projectors—the Deluxe model D (300 watt slide projector) and the Streamliner 500 (500 watt projector for 2 x 2 slides)—both of which feature "wind tunnel cooling."



Bell and Howell TDC Streamliner projector has a new air flow case for wind tunnel cooling. Note storage place below the machine.

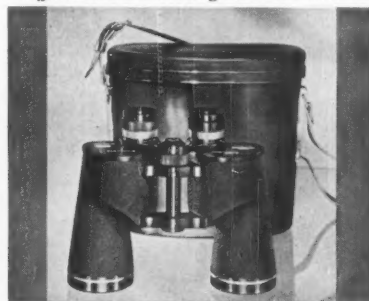
That cooling feature is an important one, as anyone who has projected slides for any length of time is well aware. The necessary light generates a great deal of heat, enough to make slides go out of focus and occasionally even enough to damage slides. In wind tunnel cooling, according to the B&H description, a new airflow case provides a two-inch-high air chamber beneath the projector. A powerful fan in the projector scoops air through an opening in the case and sends it through the cooling chamber of the projector at high speed, lowering the temperature sufficiently to keep the slides from "popping" or slipping out of focus under normal operating conditions.

The new airflow case is of two-toned gray wrinkle finish to blend with the gray, die-cast aluminum projector. The case includes storage space for six or more Selectrays. List prices for the projectors, including the cases, are \$74.75 for the Deluxe model D and \$79.75 for the Streamliner.

A third Bell & Howell projector, called the TDC Headliner 303, has a four-inch blower which operates continuously while the power cord is plugged in to keep the slides cool

BINOCULARS TAKE TELEPHOTO PICTURES

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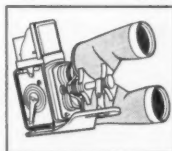
The fantastic idea of telephoto pictures thru Binoculars is now a reality. A new superb, photo-corrected Binocular works together with the normal camera lens, to record on film, enlarged pictures of distant subjects. D. P. Bushnell & Co., leaders in High Power, Precision Sport Optics, are the originators of this great development.

BINO-FOTO fits most Cameras

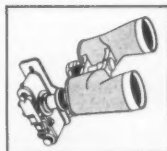
Fans all over the country are "stretching" their normal camera lenses with this marvelous, 7-power instrument to capture pictures they couldn't possibly reach before. Called the BUSHNELL BINO-FOTO BINOCULAR, it attaches *quickly...easily* to practically any camera. Simple, practical BinoDapters align camera with binocular perfectly... rigidly. They are available for 35mm, twin lens; 8 and 16mm movie cameras. Lens power is increased 700%!

Users Everywhere Acclaim It

BINO-FOTO enthusiasts—thousands of them have proven the practicability of this compact, versatile, long focal length system. It brings all the exciting wonders of telephotography—'til now prohibitively expensive—to everyone. Best of all, these Binoculars are grand for all-purpose viewing too, and fully guaranteed for 20 years.



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NORMAL CAMERA SHOT

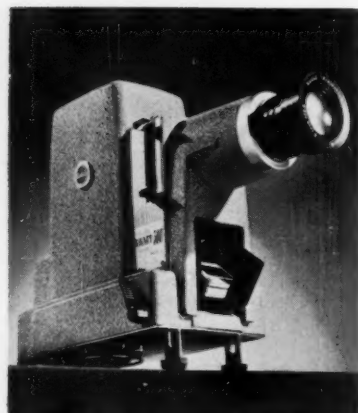


BINO-FOTO SHOT

Now it's easy to secure long distance "impossible" pics like these birds. Possibilities are endless, and the Binocular may always be enjoyed separately. Some 30 other moderately priced models, for every binocular purpose, are also featured by Bushnell.

Full data (illustrated) may be had at Camera Stores, or write D. P. Bushnell & Co., Dept. N30 Bushnell Building, Pasadena, Calif.... In Canada: 1333 16th W. Calgary, Alberta.

and to prolong the life of the lamp. It is permanently mounted in a streamlined carrying case which has built-in storage space for eight Selectrays, each of which holds 30 slides. Price for this model, including slide changer and one Selectray, is \$54.50.



New Kodaslide Signet 300 Projector Model A of Eastman.

Eastman's new slide projector is the Kodaslide Signet 300 Model A, which retails at \$59.50, plus \$19.75 for the carrying case. In this projector cooling is accomplished in three ways: through the use of high-efficiency heat absorbing glass, a quiet impeller-type blower, and aluminum baffles which direct separate air streams around the condenser optics, lamp, and slide.

Of special interest

SOME SPECIAL ITEMS for readers with special interests are noted as follows:

A new screen designed for color and stereo projection has been announced by the Radiant Manufacturing Company, 2627 W. Roosevelt Road, Chicago 8, Ill. This is the 1956 Colormaster, which features a new teardrop design case, an all-metal roller and automatic safety lock to give tension to the screen fabric, new roller action, and "atom-action" leg lock. The Colormaster has a silver surface fabric and is available in four sizes, 30 x 30 through 50 x 50.

Eastman has produced the new Kodak Illuminator, Model 1, designed to clip on the Kodaslide Pocket Viewer to give the color slide enthusiast a convenient, low-cost, electric, self-illuminated viewer. The illuminator slips over the rear frame of the pocket viewer and, by

means of a small turn-button, locks in place. Used with an eight-foot power cord, it can be useful in previewing and in editing slide sequences prior to projection. List price for the combination is \$2.95 each.

AnSCO is now supplying a simple, compact, and inexpensive synchro-flash testing device. Originally intended only for dealer use, the device has been made available to amateur and professional photographers who wish to be sure their flash equipment is in working order before staking the success or failure of an important picture on it. The tester renders a four-fold service: it tests shutter synchronization, tests flash circuits, tests flashlamps, and tests batteries and B.C. cartridges. Small in size, it will fit easily into any gadget bag, and priced at \$7.50, it will suit most photographic budgets.

And finally, for the convenience of amateur movie makers, AnSCO is now returning to the owner by first class mail all 8mm and 16mm black-and-white film and all 16mm AnSCO-chrome film sent for processing to the Union, N.J., or Chicago laboratories. This cuts time of processed film in transit from a week to about two days. It also is the company's policy to have the completely processed film on the way back to the owner the day after it is received in the laboratories. ♡ ♡ ♡

Preservation of Color and Shape In Plant Specimens

In the article "Preserve in Plastic" in our April, 1956, issue, the author stated that Professor Rudolph Specht had made an extensive study of dehydrating flowers and preserving their natural colors, and that flowers retained their preserved color when embedded in plastic after being prepared by the methods reported on by Professor Specht. Since this reference does not make clear the origin of the color-preservation methods covered by the Specht report, a review of the development of these methods appears to be in order.

In 1944 G. R. Fessenden, formerly with the U. S. Department of Agriculture, discovered that a solution of thiourea in butyl alcohol was an effective means of preserving both the pigmentation and the shape of plant tissue, and that by suitably adjusting the pH of such a solution the natural coloration could be maintained without change of shade

or hue. He furthermore found at that time that specimen material prepared by this procedure could be rendered more durable and useful by embedding it in plastic blocks, or by impregnating and/or coating it with resins or waxes.

In order to establish priority in originating and developing his new process, Fessenden described his procedures in a series of patent applications, the first of which was filed in 1947—three years before the date of publication of the University of Florida bulletin on the subject—and was issued to him in 1951. He further described his process in a paper "Preservation of Color and Shape in Plant Specimens," read before the Botanical Section of the A.A.A.S. during the 1951 annual meeting, and preserved specimens prepared by the procedures explained in the paper were displayed on that occasion. Certain of these were included with the exhibit of representative examples of natural-color preserved specimens prepared by Fessenden's procedures which were installed in the Smithsonian's U. S. National Museum in 1954.

Trees of the Keys

Alarmed at the indiscriminate clearing of trees from the more northerly of the Florida Keys, the Upper Keys Garden Club, P.O. Box 288, Tavernier, Florida, is conducting an active campaign for selective clearing of land. The club members have compiled a list of endangered trees, including gumbo-limbo, buttonwood, ironwood, West Indies mahogany, pigeon plum, wild cinnamon and others. Twenty-three species are listed in a leaflet being distributed to real estate brokers in the area. The members offer their services to mark trees that should be saved. A more complete brochure with pictures is planned in this drive to save some of the native splendor from the bulldozer.

For the Doves

At its convention at Berkeley, California, in May the California Federation of Women's Clubs went on record as requesting the removal of doves from the game lists in that State. The resolution points out that these birds are not qualified as game birds, that too many are required to make a worth-while bag as food, and that it is poor game management to kill any species while it is raising its young.

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Memorial

(Continued from page 428)

operations will be done with the least possible disturbance of the ecological balances in the forest and without exposing the area to motor traffic, or other interferences that might result in the destruction of the natural character of the forest community.

One must visit this forest, however, to enjoy the wondrous parade of the wild flowers, from the trilliums and marigolds of early spring to the gentians and asters of autumn. One must go personally to know the rich gifts of foliage, flower and fruit from the scores of species of native shrubs. There are sumacs, witch hazel, moosewood and the charming families of juneberries and dogwoods. And who, besides Thoreau, has yet pronounced a tribute worthy of the wondrous flora of a northern bog?

Finally, there are the birds. Within the Ladysmith High School Memorial Forest, many students have seen the ruffed grouse on her nest and have glimpsed the precocial young as they vanished in Nature's camouflage. Girls and boys have heard the raucous call of a raven over a winter landscape, and witnessed the noisy whacking of a pileated woodpecker on an ancient tree trunk. They have seen a hummingbird on its nest high in a pine tree. One student photographer, on a still hunt, set his tripod over a woodcock on its nest, and later "shot" an American bittern on a beaver pond. These are only a few of the adventures in conservation education and with Nature that suggest the rich values of the Ladysmith High School Memorial Forest, no transitory tribute from young America to the past and to the future ♫

Dove

(Continued from page 434)

to see him, he hopped delightedly from one head to another.

When my husband came home we checked the number on the aluminum band. 533-30848 appeared on the band and in the record book.

That night Coo choose a lampshade for a roost, and for three nights roosted contentedly there.

Then he took to the trees for good. He plainly began staking out his territory at the back door, cooing

earnestly, and chasing other doves. But worst of all, he began flogging our heads with his wings and pecking our feet, acting much like a gander or turkey gobbler at nesting time.

Every time I filled his dish, he pecked my feet up three back steps and then stood waiting for me to close the inside door. Satisfied, when the door closed, he turned and hopped down the steps and ate his grain. In a short time he brought his mate down and shared his food with her.

Coo carried sticks and straws to a crotch high in a nearby elm tree, while his mate sat on the spot arranging and rearranging them.

"Our Coo has more to offer a girl than the other doves in the neighborhood," I laughingly told my husband.

"Yes," he said, "a glass ash tray filled with the best parakeet seed money can buy." ♫ ♫ ♫

Planets

(Continued from page 437)

trated on the more unusual objects. A single photographic plate taken for other purposes with the 48-inch Schmidt at Mt. Palomar may record from fifty to one hundred asteroids, of which perhaps eighty percent are new discoveries. Because of the prohibitive number of man-hours involved in recording them all, they are usually ignored unless their motion appears peculiar in some respect. Photographic records are, of course, permanent. Thus the possibility of a general survey at some future date is not precluded.

The question of the origin of asteroids is a hotly debated one. It involves their motions as well as their shape and chemical composition. It was not possible to do justice to the subject within the scope of the present article. We shall treat it separately in the November issue.

In the month of October, the New Moon will occur on October 4 and the moon will be full on October 19.

Mercury will be a morning star, rising about an hour and one half before the sun on October 15. In Virgo, it will reach its greatest western elongation on October 12.

Venus will be a morning star, too, rising approximately three and one-half hours before the sun throughout October. On October 5, it will be

found less than half of one degree south of Regulus. On October 25, it will be seen two-tenths of one degree north of Jupiter, with which it should make a striking pair.

Mars, in Aquarius, will be up in the southeast at sunset. On October 15, it will cross the meridian at about 10 P.M. and set at about 2:30 A.M.

Jupiter, in the morning sky, will rise at 3:30 A.M. on October 10 and at 2:30 A.M. by the end of that month. Note its proximity to Venus on October 25, as described above.

Saturn, in Libra, will be very low in the southwest and will set at about 7:30 P.M. on October 15. On October 7 it will be less than two degrees north of the crescent moon.

The Orionid meteor shower on October 20 will not be favorable because of the Full Moon. A maximum zenith rate of 10 per hour is all that may be expected. ♫ ♫ ♫

Echo Park

The Winter-Spring, or Number 55, issue of *The Living Wilderness* is one-half devoted to a complete and historic review of the controversy caused by the proposal to erect Echo Park Dam within Dinosaur National Park. It is important that the whole story of the battle for the integrity of the area should thus be compiled and preserved. It is published by The Wilderness Society, 2144 P Street, N.W., Washington 7, D.C.

Forest Film

"The Sunken Forest" is the subject of a ten-minute, 16 mm sound and color movie available from Thorne Films, Inc., 1707 Hillside Road, Boulder, Colorado. It takes the viewer on a trip through the amazing holly forest on Fire Island Beach, fifty miles from New York City, now saved as a preserve. The film rents for \$2.50, and copies are sold for \$100.

Mianus Gorge

Several additional tracts have increased the area of the Mianus River Gorge Preserve in Greenwich, Connecticut, and adjoining Westchester County, New York. This preservation program was described in the December, 1955, issue of *Nature Magazine*. The area now owned, or under purchase contracts, totals 145 acres. A drive is on for funds to meet current obligations for land purchase.

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Nature AND THE MICROSCOPE

By JULIAN D. CORRINGTON

The Microscope Makers XIV. Ernst Leitz, Der Sohn



OUR ACCOUNT OF THE HISTORY and fortunes of the great firm of

E. Leitz, Inc., now reaches the modern era and is concluded by this fourth installment. Founded by Carl Kellner, carried on by Friedrich Belthle, and expanded from a small and local company to a world-renowned organization by the Senior Ernst Leitz, a far greater growth and specialization was to be witnessed by the passing years of the twentieth century.

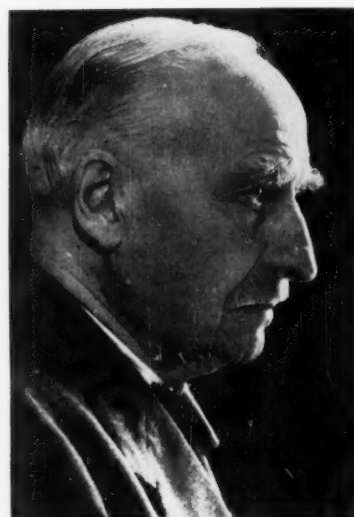
The first Ernst Leitz passed away in 1920 at the age of seventy-seven, but long before this time his oldest surviving son, named for the father, had taken over more and more of the direction of the plant. Since the turn of the century young Ernst, born in 1871, had been studying the growth of the optical industry and concerning himself especially with the development of new inventions and improvements. He became known as the Junior Chief, and familiarized himself with every aspect of the manufacture of microscopes, being rewarded by a partnership with his father in 1906. Full responsibility for keeping the ball rolling devolved upon him during the difficult years of the first world war and subsequent inflation and depression, and full control upon the death of his father.

The second Ernst Leitz displayed many of the characteristics of his famous sire. His biographers stress that he has been forceful and energetic in his management, international and timeless in outlook, and always with a keen sense of responsibility tinged with optimism. After becoming Senior Chief he began to do away with small and separate buildings. In 1907 the first large five-story factory went up, incorporating advanced designs in heating and ventilation. New machinery was installed, new ideas in electrified and automatic equipment to

speed up production and increase safety were evolved. The years 1935-9 saw the completion of the huge "Magazine Building," to house the scientific bureaus, and two very modern buildings furnished with the newest improvements to accommodate production of the burgeoning Leica camera and its allied apparatus.

The Leitz business is a many-sided one and it became so through the generalship of the new leader. Concerning the fundamental instrument, a new and large-sized stand for the compound microscope was produced in 1902, incorporating the English base and a gracefully curved arm to replace the older straight type, while the stand of 1906 took on a quite modern appearance, toned down somewhat in size, with a horseshoe base, and with a side fine adjustment that soon received acclaim both at home and abroad and was widely copied. Again, in 1925, Leitz led the way with marked improvements in the fine adjustment and micrometer head, the work of the plant manager, August Bauer.

Research by Carl Metz, top mathematician of the Leitz staff, resulted in final plans for a binocular microscope of the Greenough type in 1907, and then the first binocular-monobjective instrument in 1913, a welcome innovation. Superintendent Paul Weillinger and Hermann Heine, Chief of the Construction Bureau, collaborated in 1919 to produce the famous Leitz Universal Microscope, which required refiguring and new designs based on the theoretical work of Gauss and Abbe. A new division of the plant was built for this purpose. The result was an instrument with interchangeable monocular and binocular bodies, for ordinary or polarized light, and with both transmitted and incident illumination. Following the suggestion of Dr. Ernst Wecker, Heilbronn chemist, a binocular body was manufactured for insertion in the tube of a regulation monocular instrument, so that the owner of such a microscope could



Ernst Leitz, the son.

avail himself of the advantages of the newer type.

Considering the long-neglected eyepiece, Carl Metz went to work on the 1909 Huygenian model and came forth with the periplanatic ocular in 1914, a greatly improved design. He also introduced the demonstration eyepiece, so useful in teaching, in 1910.

Discovery of the spirochete of syphilis in 1905, and the necessity of elucidating it clearly and unmistakably under the microscope, gave impetus to new designs for condensers that would yield the darkfield form of illumination. Leitz produced a bispherical type in 1907, followed by Jentzsch's concentric model in 1910. The culmination of work in this branch of investigation was Heine's Ultropak, of 1931. The head of Leitz's scientific bureau, Dr. Max Berek, concerned himself with continual improvement of polarizing microscopes and the manufacture of metallographs. Dr. W. Schmidt, Giessen zoologist, developed a new kind of binocular polarizing microscope for biological research, and in rapid succession came specialized instruments for observing metals under heat treatment, shop microscopes, the dilatometer and orthometer, the contour projector, and still other novel instruments that opened new fields as tools of research or control.

A crowning achievement of all this great upsurge in optical engineering was the production of the well-known Ortholux microscope, one of the most compact and complete as well as handsomest outfits possible to assemble. It is a reversed type

instrument, large and heavy, with built-in illumination for brightfield, darkfield, and polarized light, and with interchangeable inclined monocular and binocular bodies for direct observation, photomicrography, projection, or drawing. In recent years Leitz has produced one of the finest phase-contrast microscopes on the market.

Specialized photomicrographic instruments grew out of the earlier efforts of the elder of the Leitz boys, Ludwig, who died in 1898. The universal vertical camera apparatus of 1905 gave way, after the war, to assembly UMA, larger and more complex, and in 1933 to the far superior Panphot. Additional Leitz products that underwent continual improvement, with new models from time to time, were microtomes, projection machines, polarimeters, hemoglobinometers, colorimeters, spectroscopes, and many others.

Rise of the Leitz organization to one of world prominence cannot be attributed to any one product, person, or factor. Famous as were their microscopes and other laboratory instruments, they were eclipsed in the mind of the man on the street by the Leica camera, known the world over as supreme in its field. Two men must be given the credit for this amazing instrument; Oskar Barnack, who designed it, and Ernst Leitz, who built it. Beginning in 1924, more than half a million of these expensive cameras have been sold, catching up rapidly in sales volume with microscopes, which had a start of many years.

Today the house that was Carl Kellner's first workshop, one hundred and seven years ago, still stands in Wetzlar as a landmark of past times. At the foot of the ancient Kalsmunt ruins, on the site of the first meeting-place of burghers in medieval times, now rise the ten great buildings of the main Leitz works. Here are the research, manufacturing, and commercial departments. To one side stretch the company residences for employees. In 1917 Leitz bought out the optical institute of W. & H. Seibert; but this company was only returning to the fold after all, as the owners were nephews of Carl Kellner, under whom they had been trained. Leitz also operates a branch in Rastatt, in Baden, specializing in motion-picture projectors.

Just as the senior Ernst Leitz had

taken a great step forward in socialization of his plant by inaugurating a sick fund in 1885, so the younger Ernst conceived and put into execution a pension plan in 1899. He also enlarged the hospitalization program, and used interest from the fund to build charming single-family dwellings for his personnel. Ernst Leitz the younger has been the recipient of many honors. He was made an honorary doctor of medicine by Giessen in 1912, an honorary doctor of philosophy by Marburg in 1922, and an honorary senator of a number of colleges and schools.

He has been ably assisted by his three sons. Ernst, oldest of the three and third of the name, born in 1906, has been trained in the tradition of the father and grandfather, and has taken over the technical direction of the plant. Ludwig, the second son, born in 1907, is in charge of the scientific bureau. The youngest son, Gunther, born in 1914, is following in the footsteps of the business director of the plant, Henri Dumur (born 1885) whose financial acumen has been responsible in large measure for bringing Leitz to its present position of eminence. The rapid rehabilitation of the works after the American occupation of 1945 was engineered by his personal drive. Many other fine specialists and technical workers have insured the continuance of Leitz in the forefront of the microscope makers, but we shall mention again August Bauer, technical director from 1913 until his death in 1943. During these thirty years he was instrumental in building up the organization to its modern status.

From the standpoint of present-day Western Germany and Western democracy it is a fortunate chance that Wetzlar was located in the American Zone and at no time was under Russian occupation. It was therefore not long after the close of the second world conflict before Leitz was again doing business in the United States, where its productions have always been highly esteemed. The address of their New York office is E. Leitz, Inc., 468 Fourth Ave., New York 16, N. Y.

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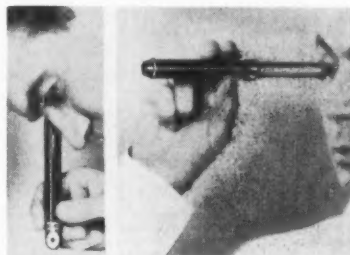
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fame they are included here for the sake of completeness in our discussions of heavenly apparitions.

The Aurora Borealis or Northern Lights, and the Aurora Australis of the southern hemisphere, consist of vast arcs, bands, or streamers, often in complex and varied shapes, of red, yellow, green, and white lights, best seen in north latitudes of about 70°. These lights are believed to be due to electrical discharges from the sun, consisting of free electrons shot off and intercepted by our upper atmosphere to produce colored bands in something of the same manner as occurs in fluorescent lamps. At each pole of the earth these streams of electrons are deflected into a spiral path by the earth's magnetic field and so they do not reach the equatorial region. The aurora is held to be proof that the earth's atmosphere extends outward into space for at least six hundred miles.



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Wouldst offer up this pestilential beast?

She hath *Mycobacterium t-b*,
And foul *Actinomyces* mars her jaw!
Doth brucellosis not disqualify?
And whence those warbles, and that spavined knee?
Couldst see the protozoa in her maw,
O priest, you'd lead her posthaste to the sty.

—Ode on a Grecian Urn

Postmor Temquotes

Shelley:

Hail to thee, blithe spirit!
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—To a Skylark

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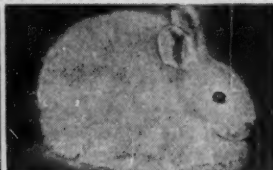
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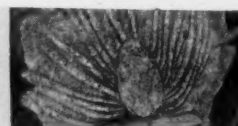
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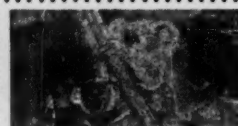
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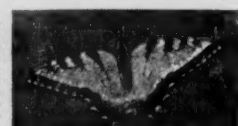
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